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THE

FARMER'S ASSISTANT;

BEING

A DIGEST

OF ALL THAT

RELATES TO AGRICULTURE,

AND THE

CONDUCTING OF RURAL AFFAIRS;

ALPHABETICALLY ARRANGED,

AND ADAPTED FOR THE UNITED STATES.

BY JOHN NICHOLSON, ESQ.

OF HERKIMER COUNTY, STATE OF NEW YORK.

SECOND EDITION, CORRECTED AND ENLARGED.

PUBLISHED BY BENJAMIN WARNER,
AND SOLD AT HIS BOOKSTORES, IN PHILADELPHIA,
AND RICHMOND, VIRGINIA.
William Dickson, Printer, Lancaster, (Pa.)

1820

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Gift of
Prof. John S. P ay.

Eastern District of Pennsylvania, To wit:

L.S.

BE IT REMEMBERED, that on the twenty-sixth day of July, in the forty-fifth year of the Independence of the United States of America, A. D. 1820,

BENJAMIN WARNER,

of the said district, has deposited in this office the title of a book, the right whereof he claims as proprietor, in the words following, to wit:

"The Farmer's Assistant; being a digest of all that relates to Agriculture, and the con-
"ducting of Rural affairs; alphabetically arranged, and adapted for the United States.
"By John Nicholson, Esq. of Herkimer county, State of New York. Second Edition,
"Corrected and Enlarged."

In conformity to the act of the Congress of the United States, entitled "An act for the encouragement of learning, by securing the copies of maps, charts, and books, to the authors and proprietors of such copies, during the times therein mentioned."—And also to the act entitled, "An act supplementary to an act, entitled "An act for the encouragement of learning, by securing the copies of maps, charts, and books, to the authors and proprietors of such copies, during the times therein mentioned," and extending the benefits thereof to the arts of designing, engraving, and etching historical and other prints."

D. CALDWELL,
Clerk of the Eastern District of Pennsylvania.

INTRODUCTION.

THE following Work is offered for the patronage of the Farmers and Planters of our Country. It is believed to contain a summary of the best means, known among us, for each to conduct his business to advantage. The various articles comprising the Work are arranged in alphabetical order, with references to each other, where they have a necessary connection. The Work is mostly abridged from the essays of others; interspersed, however, with some original remarks. Considerable acknowledgments are due to the Gentlemen whose essays have been published by 'the Society for the promotion of Useful Arts,' in the State of Newyork, of which the Author is a Member; and also, to the essays of those composing 'the Philadelphia Society for promoting Agriculture.'

The first Edition of the Work was intended principally for the northern part of our territory; but, as farming has general features of similarity in all Countries, it was thought expedient to enlarge the Work, so as to include all that relates to Agriculture; to offer it as the Assistant, as well of the Planter of the South, as of the Farmer of the North. In speaking of these, however, no other distinction is intended, than what is sanctioned by custom; every Planter is a Farmer, and every Farmer a Planter, as the terms are commonly understood in this Country.

Although, in some parts of Europe, practical Farming may be considered as nearly reduced to a science; yet, in this Country, from inattention to this important subject, owing, perhaps, to the ease with which a subsistence is acquired, where lands are plenty, the means of making the most of the labors of the field is, in general, but imperfectly understood. On this subject, the existing knowledge in other Countries, even if brought home, would not, in all respects, be knowledge for us. A difference in soils, climates, and the productions to be raised, must ever be productive of differences in the best modes of Culture. To the agricultural Geniuses of our own Country we must, therefore, look for aid in maturing the best system of Farming here; and, no doubt, in a country possessing such varieties of climate and soil, many variations will be found necessary.

Some Chemists of Greatbritain, and elsewhere, have gone into the analyzation of earths, in order to ascertain the constituent parts of those which are fertile, and of those which are sterile; and thus, by ascertaining the substances which form the rich, to be able to point out the ingredients which are necessary, as permanent additions to the poor. It is to be hoped, that the Chemists of our own Country, stimulated by the example, will turn their attention to similar inquiries, and to others which are calculated to throw light on the economy of the vegetable world, and the means of increasing its products. The chemical operations of vegetation are, indeed, slow, and apparently hid from our view; but patient investigation will, no doubt, lead to discoveries highly important to the science of Agriculture.

The Planters and Farmers of our Country enjoy the peculiar blessing, of being the Lords of the soil they cultivate; and it is to be hoped they may long enjoy this preeminence over the Husbandmen of Europe. This circumstance, while it is conducive to that Independence and Freedom, to which the Cultivator of the earth is justly entitled, is calculated to draw forth his talents in the practical improvement of the Country; for to this there is every inducement, when the result of his labor and skill in improving his lands becomes a permanent benefit to himself, or his Posterity, and not to an avaricious Landlord, or a lordly Master.

It is fortunate for the interest of Agriculture, in the Northern States particularly, that Farming is there becoming a more respectable employment, as those engaged in it become more enlightened in the best mode of Culture, and of course enabled more successfully to compete with those who pursue other avocations, as the means of acquiring wealth. The Cultivation of the earth, when conducted in the most approved manner, is a sure mean of accumulating property; and, though the progress to wealth may not always be so rapid in this way, as it sometimes is in others, still, as it is less liable to those casualties which are often productive of ruin, all that seems necessary, is a conviction of these important truths, to entitle Agriculture to a high standing among the various means pursued for assuring that Independence, which is so essential to tranquility in life.

In the States farther to the South, Agriculture has always held that high and respectable standing, to which it is justly entitled. There the Man, whose Name stands highest in the affections of our Country, was a Farmer, and he, and many others, whose Names are an honor to our Country, have been ardently attached to that employment.

The Cultivation of the earth has indeed been the favorite pursuit of many of the wisest and best Men in all ages; and it is worthy of note, that wherever the Lovers of rural life have been called forth as the Defenders of their Country, or to assist in its Councils, they never have been known as the Subverters of its Liberties: Such is the sterling virtue with which Men are usually endued, who have a particular veneration for the plough and the hoe. An ambition for lawless power, and a love of rural life, are, perhaps, incompatible. It is to be hoped, that from amongst our Cultivators, many a CINCINNATUS may arise in succeeding times; who, after having 'rulled the storm of mighty war,' or shone in the Councils of his Country, shall again 'seize the plough,' and 'greatly independent live!'

To him who has a relish for the Culture of the earth, it is unnecessary to dilate on its pleasures; and to him who possesses not a taste of this kind, the task would be useless. A taste, however, for particular pursuits, is susceptible of being strengthened and improved; and to this, nothing is more conducive than to clear the subject of its difficulties, and to render the path plain and easy. We usually travel with delight on the road which lies plainly before us; but often with perplexity on that which is intricate or unknown. If, therefore, the Farmer would derive the greatest pleasure, as well as the greatest profit, from his employment, let him first be diligent in making his way plain; let him become as fully enlightened as possible in all that tends to render his labors productive, and this will greatly strengthen his relish for his employment, and render its pleasures more obvious and striking. 'The FARMER'S ASSISTANT' is intended to simplify and methodise the existing knowledge of Farming in our Country; and, as far as the Author shall be found to have succeeded in the attempt, so far shall his most predominant ambition be gratified.

THE AUTHOR.

May 10, 1818.

RECOMMENDATION.

JOHN NICHOLSON, Esq. the Author of the Book published under the Title of "The Farmer's Assistant," having submitted to my inspection a number of manuscript papers, containing materials which he intends to make use of, as Additions and Corrections, in a second Edition of that Work; I have no hesitation in giving it as my opinion, from a partial perusal of those papers, and my knowledge of his industry and competency to the task he has undertaken, that the contemplated publication will be a production of great value to the Agricultural Class of our Countrymen.

SIMEON DE WITT,

President of the Society for the Promotion of Useful Arts in the State of New York.

I concur in the above Recommendation.

DE WITT CLINTON,

Governor of the State of New York.

Albany, April 29, 1818.

FARMER's ASSISTANT.

A.

AIR. Seeds which are buried so deep as to be secluded from their requisite portion of air will not vegetate; for this reason, weeds are constantly springing up in new ploughed grounds; those seeds which before lay too deep for vegetation being turned up nigher the surface.

Let seeds be sown in the glass receiver of an airpump, exhausted of air, and they will not vegetate; but admit the air and they will grow directly.

The lodging, or falling, of some kinds of grain and of grass, is owing to standing too thick to admit a free circulation of air, by means of which they can only preserve a healthy state. Plant one grain of wheat, for instance, in the richest soil, and the stalks when grown will not fall; but plant a great number of grains in the same soil, so closely together as to preclude a free circulation of air amongst the stalks, and they become unable to sustain their own weight.

Air consists of different *gases*, as they are termed; the *oxygene* gas, or *vital* air, which is essential to the existence of all animals; the *hydrogene* gas, or inflammable air; the *nitrogene* gas, or common atmospheric air, deprived of its oxygene, by having served the purposes of respiration or combustion, and which is also called *azote*; and the *carbonic acid*, formerly called *fixed air*, so often found fatal in the bottoms of wells and elsewhere. These are the principal; but by the application of a sufficient degree of *caloric* (heat) all liquid substances can be changed into the gaseous state.

The common atmosphere is principally composed of the oxygene and nitrogene gases, being about twenty-one parts of the former and seventy-nine of the latter.

As the oxygene or respirable air is essential to the existence of animals; so the hydrogene and the azote is absorbed in plants, and is essential to their growth. Plants also, while exposed to the light, emit oxygene. Thus, by the economy of Nature, the vegetable world is continually absorbing that air which is hurtful to Man, and is almost constantly reproducing that which is healthful.

See further, Food of Plants.

APPLES. The seeds of an apple seldom produce trees which bear the same kind of apples, and hence the necessity of grafting, when we would raise the same kind.

A judicious selection of trees which bear the best apples for different uses, is a matter worthy of particular attention. *See* Cider, Orchard, &c.

In gathering apples, for Winter-use, they should be *picked* from the tree, and laid carefully in a heap, under cover, without being bruised. After they have *sweated*, let them be exposed to the air and well dried, by wiping them with dry cloths; then lay them away in a *dry* place where they will not freeze. The time requisite for sweating will be six, ten, or fifteen days, according to the warmth of the weather.

Mr. *Forsyth* says, that 'the most complete method of saving them, so as to preserve them the greatest length of time, is to wrap them in paper and pack them away in stone jars between layers of bran; having the mouths of the jars covered so close as to preclude the admission of air, and then to keep them in a dry place where they will not be frozen.

The fruit should not be gathered till fully ripe, which is known by the stem parting easily from the twig: It should also be gathered in dry weather and when the dew is off.

Mr. *Deane*, in his '*Newengland Farmer*,' speaking of his method of preserving Winter apples, says:

'I gather them about noon on the day of the full of the moon which happens in the latter part of September, or begining of October. Then spread them in a chamber, or garret, where they lie till about the last of November. Then, at a time when the weather is dry, remove them into casks, or boxes, in the cellar, out of the way of the frosts; but I prefer a cool part of the cellar. With this management, I find I can keep them till the last of May, so well that not one in fifty will rot.

'In the Autumn of 1793, I packed apples in the shavings of pine, so that they scarcely touched one another. They kept well till some time in May following; though they were a sort which are mellow for eating in December. Dry sawdust might perhaps answer the end as well. Some barrel them up, and keep them through the Winter in upper rooms, covering them with blankets or mats, to prevent freezing. Dry places are best for them.'

Mr. Deane then goes on to offer his reasons, why the full of the moon should be prefered to any other time, and concludes with an opinion, that even apples for cider should be gathered at that time. Certain it is, that many Farmers have the fullest belief, that the full of the moon is the most proper time for many things to be done, in the line of their business; and it may be knowledge which is the result of long experience, and handed down from Father to Son, even from times more remote than we are apt to imagine.

It is confidently asserted by many, that apples may be safely kept in casks through Winter, in a cold chamber, or garret, by being merely covered with linen cloths.

APPLETREE (*Pyrus Malus.*) This tree flourishes most in a fertile sandy loam, sandy, or rich, warm, gravely soil. A stiff clay is not good, even though it be rich. It thrives better in a poor sandy soil than in any other poor earth.

Some appletrees bear alternately and some yearly: The cause of the former is said to be owing to the young tree bearing too large a crop at first; for this so exhausts it as to render it unfit for bearing the next year; in the mean time, it becomes sufficiently recruited for a heavy crop the third year; and thus it becomes confirmed in the *habit* of alternate bearing, in which it ever after continues. In order, therefore, to prevent young trees from geting into this habit, let the young fruit be striped off where it appears too plentiful, but less and less each year, until such time as the tree can bear a full yearly crop, and thus become confirmed in the habit of a yearly bearer. Perhaps a tree that has become confirmed in the habit of alternate bearing might have its habit changed, by once or twice divesting it of its young fruit during the bearing year, and manuring it well during that season.

Take a scion from a yearly, and graft it on the limb of an alternate bearer, and it will become alternate, and vice versa. But if the true reason has been given for alternate bearing, it does not follow that a scion from a yearly bearer, when grafted on a stock that has never borne, will become alternate. In the first case, the habit of the alternate bearer, being already confirmed, regulates the scion; but where the habit of the scion has become confirmed, and that of the young stock has not, it would seem that the habit of the scion must prevail. At the Summer solstice, the bark of the body of an appletree may be taken off, and a new bark will presently form, which will regenerate the tree, and render such, as were before barren, productive.

See further; Fruit-trees, Orchard, Nursery, and Crabapple.

APRICOT. The culture that is proper for a peachtree is also good for an apricot, with this difference, that it requires a lighter and warmer soil than a peachtree.
See PEACHTREE.

ASH (*Fraxinus.*) There are three kinds of ash in this Country; the white, the yellow, and the black. The upland whiteash is the best timber; but is liable to a white rot when kept too much in contact with the ground. Winter is the best time for felling it to preserve the white part from worms. The blackash is the most durable wood for rails, &c.

ASHES. *See* MANURES.

ASPARAGUS (*Officinalis.*) To make a bed of this excelent Spring-green, open a trench four or five feet wide and one foot deep, in the warmest part of your garden; the warmer the better. Fill the trench half full of good barn dung; level it, and scatter some good earth over it; then lay on your roots, eight or nine inches apart, in their natural position; or, if seeds be used, about half that distance apart: Fill up the trench with good soil and your bed is made.

If roots be planted, they may be cut the second year; but if seeds, not till the third. After the bed is fit for use, all the shoots which come up during the first six weeks may be cut off; but all after that should run to seed to strengthen the plants.

As this plant is one of the first green vegetables which the opening season presents, and as no substitute equally productive can be had till the season for green peas and beans, it becomes a matter of economy to have two asparagus beds; the first to be brought forward as early as possible; the other late. For this purpose, the latter ought to have a northern exposure, and it should be spaded in order to retard its growth; by which means the plants will be equally large and yet very tender. The roots should be laid so deep as to admit of spading the ground over them. The beds should be kept clear of weeds throughout the season. In the Fall, they should have a layer of roten dung spread over them, an inch in depth, which may in part be taken off the next Spring; and, when the bed becomes too high by the constant addition of dung, part of the earth may be pared off in the Spring, before the plants shoot, and the bed covered again with a thin compost of roten dung.

ASS. This is a valuable animal for carrying burdens, and for being used in small carts. Mr. *Livingston* observes, that for these purposes they are much used in the country between Nantz and Paris; and that even loads of wood and hay are there carried on their backs. Their use for many purposes in this Country, particularly in villages, would be found an article of economy; they will subsist on the coarsest fare; may be kept at constant service; are subject to few or no diseases; and they live to a great age.

It is also mentioned in '*The Complete Grazier*,' that Asses have been successfully used in Greatbritain for ploughing light lands, four of them being equal to two Horses.

B.

BARLEY (*Hordeum*.) This is a hardy grain, subject to few diseases, bears the drought well, and is profitable for cultivation. When hulled, it may be ground into flour, which makes a bread whiter than wheat, and but little inferior in taste. Soups made of it, when hulled, are as good as those made of rice, and are accounted cooling and detersive in fevers. The longer this grain is kept the better-tasted it becomes; as the cause of its bad taste is owing to its hull. The usual allowance of seed for an acre is two bushels; but this is hardly sufficient: In general, two and a half is better. Barley has frequently been known to yield sixty bushels an acre. It requires a soil in good condition, and, like many other crops, turns to poor account when sown on such as are poor. The best for raising it are the loamy, sandy-loamy, or gravelly soil; but it will do very well even on a strong stiff clay, provided it be well mellowed with frequent and effectual ploughings and harrowings; and these can be done to the best effect in the Fall preceding.

As barley is a dry husky grain, and requires considerable moisture to cause it to vegetate, it should be sown when the ground is sufficiently moist. It should also be sown as soon as the ground can be well prepared in the Spring. This grain receives essential benefit from being soaked in lye, brine, or some other fertilizing liquor. An English Writer mentions an experiment made, some years since, which may be worth inserting.

'The last Spring,' says he, 'being remarkably dry, I soaked my seed-barley in the black water taken from a reservoir which constantly receives the draining of my dung-heap and stables. As the light corn floated on the top I skimed it off, and let the rest stand twenty-four hours. On taking it from the water, I mixed the grain with a sufficient quantity of wood-ashes, to make it spread regularly, and sowed three fields with it. The produce was sixty bushels to the acre. I sowed some other fields with the same seed, dry; but the crop, like those of my Neighbors, was very poor, not more than twenty bushels an acre, and much mixed with weeds. I also sowed some of my seed dry, on one ridge, in each of my former fields; but the produce was very poor, in comparison to the other parts of the field.'

Adding some saltpetre to the liquor, in which the barley is soaked, will probably be found of great service.

See Sowing.

It is injurious to harvest this grain before it is thoroughly ripened; and, after it is cut, it should lie a night or two in the dew, in order to make the beards come off more easily in threshing.

This grain, like many others, will degenerate so much in a few years as not to be worth cultivating, if the seed be not frequently changed. The Farmer ought, therefore, to procure new recruits of seed brought from some considerable distance. It may be advisable, also, to change the *kind* of barley, in order to ascertain which is most suitable to the soil. These are various: There is the two-rowed, the four-rowed, and the six-rowed barley; and there is also a species of barley which has no husk upon it, which is commonly called Spelt. (*See* Spelt.) The six-rowed barley is sowed in England and Ireland, as a Winter-grain, and is there called bear, bere, or barley big. It shells very much, if suffered to stand until it is sufficiently ripe. The four-rowed barley has generally been cultivated in this and the neighboring States; probably because, in them, it has generally been found the best for cultivation.

As in some parts Farmers have attempted to cultivate this grain without success, it may be well to observe, that perhaps the cause of this failure was owing to their lands not having been made sufficiently *rich;* to not having been *ploughed* and *harrowed* sufficiently; to not having sowed on them a sufficiency of seed (for, if this be not done, this grain will often be choaked with weeds); to seed, which had become *degenerated*, by having been too long used in one part of the country; or, perhaps, to the *kind* of barley not having been suitable to the soil. If the Farmer has satisfied himself as to all these particulars, and still finds himself unsuccessful in the culture of this grain, he may conclude that either his soil, of whatever kind it may be, or the climate in which his farm is situated, is not suitable to the culture of barley.

Some* Farmers of Fairfield, in this county (Herkimer) have raised goods crops of this grain, for six or eight years successively, on the same ground, without any manuring, and with rather an increase of the crop. The soil on which this is done is a deep dark-colored loam. The crops are usually about forty bushels to the acre, and are raised with but slight culture; the stubble-ground where the last crop grew being merely ploughed up in the Fall, and crop-ploughed in the Spring, when the next crop is harrowed in. In harvesting, after the crop is cut with the cradle, and has lain a sufficient length of time, it is raked up like hay, without any binding into sheaves, and carted in.

How long these lands will endure this culture, without any manuring, and yet produce good crops, or whether similar results, may in general be obtained from all other good barley-lands, is more than we can determine.

Wherever a country is found suitable to the culture of barley, and not so for raising wheat or rye, there, particularly, it becomes highly expedient to erect mills for hulling barley; for this grain, when hulled, can be converted into very good bread. Peas may also be hulled at such Mills, which renders them excelent for soups, &c.

BARN. The size of the barn should be proportionate to the produce of the farm; for in this Country, where building is not expensive, all the hay and grain should be stored in a building sufficient to cover them. Many Farmers content themselves with a small barn, perhaps not sufficient to hold half their produce; while most of their hay is left in their meadows, in stacks, to be there foddered out to the cattle in the course of the Winter. In this way the manure is almost totally lost, as a stack containing five tons of hay, fed out in this way, would not manure an eight of an acre to any essential purpose. Cowdung, in particular, is most beneficial when buried *in* a *dry* soil; but when laid *on* a *wet* soil it answers but little purpose. In the mean time, if the meadow happens to be bare and unfrozen, as is often the case, the cattle may indeed have the chance of picking some dead grass; but at the expense of destroying the roots, and of poaching the soil with their feet, which produces an additional injury to the meadow.

If the ground will admit, the barn should be about so far distant from the house, and in such direction from it, as to preclude all danger of fire being communicated from the one to the other, by the means of the most prevalent high winds.

The Farmers of the older parts of Pennsylvania build very large barns in general; and to obviate the consequences of the hay or grain heating, in a large mow, four poles or pieces of timber are set up in the middle, so as to form within them a square space of about two feet. The poles are braced by cross pieces at certain distances. Through the apperture thus made, the extra moisture in the hay or grain has a chance to escape, so as to prevent its being mowburnt. Their barns are usually built of stone, and in the walls a large number of small holes are made for the admission of air. Their cattle are chiefly all housed, and their dung is under cover when thrown out of the stables, to prevent its being injured by the rains. The roofs of the barns are usually painted, to preserve them against the weather.

The floor of the barn should be kept tight, so that the grain cannot fall through in threshing, and for this purpose it should have a layer of thin boards under it. It is most advisable, also, to have a place set apart in the barn for the purpose of storing away the grain, after it is threshed. The bins for the grain should be made of hard plank, to prevent the rats and mice eating through them, and should have lids which can be fastened down with padlocks. A row of narrow bins, with different apartments for various kinds of grain, may be placed very conveniently along the side of the floor where the horsestable is placed, so as to be partly under the manger.

BARNYARD. The practice of having a barnyard on a declivity is a bad one, as in this way very much manure is washed away, without essentially benefiting the adjoining grounds. The yard should be level, and lowest in the middle, in order to prevent the escape of much fertilizing liquor, that will otherwise run off from the dung during heavy rains. It should be cleared in the Spring of the dung made during Winter; and if the Milch-cows and other cattle are to be kept in it at night, during Summer, much manure may be made in it by carting in rubbish of various kinds, together with suitable earths, to mix with the dung of the cattle and absorb their stale.

The yard should also have a high close fence round it, as well for securing the cattle as for breaking off the winds; and, in order to make the most of the dung, the cattle should be kept constantly in the yard during the season of foddering, and have a well close adjoining to supply them with water. The stiffer the soil of the barnyard, the less manure will be lost by the stale and wash soaking into the earth; and for this reason some have taken the trouble to cover the whole with a thick layer of clay.

BEAN (*Vicia.*) There are a great variety of beans; some of which are best adapted for field-husbandry, and others for culinary purposes. For the former, the English or Windsor bean is the best for strong clays and other rich soils, and the little white bean, for those which are light and dry. They are each cultivated in the drill method, and ploughed and hoed like other hoed crops.

The English bean is to be sowed early, as a little frost will not hurt it. When they have grown to the height of about three feet, and incline to become too tall, the tops should be broken off. After gathering the first crop, the stalks are to be cut off close to the ground, and a growth of suckers will rise and afford another green crop late in the Fall.

The little white bean is to be pulled before the Fall frosts, and to lie on the ground to dry and ripen. The haulm of beans should be saved for Winter-food for Sheep, as they are very fond of it.

For culinary purposes, the Canada bean, which is a bush-bean, ripens soonest, and is therefore to be prefered for an early supply: The pods, however, become unfit for eating when the bean has attained its size. Of those which have vines, the caseknife bean, the cranberry, and the thousand for one, so called, are very good. The short bean, as it is called, is also much esteemed, on account of the pod being good to eat when the bean is full grown. Mr. *Dean* says, the best manure for beans which have vines is hog's dung with a mixture of ashes.

When beans are cultivated in a climate that is not natural to them, they degenerate; and, therefore, fresh supplies of seed should be obtained from that country to which they are best adapted.

As the culture of the bean is not likely ever to become a part of field-husbandry, in this Country, we omit going to any length on this article. Their culture here seems to be naturally superseded by that of Indian corn.

BEER. *To make Sprucebeer.* Boil some spruce-boughs with some wheat-bran till the water tastes sufficiently of the spruce; strain the water, and stir in at the rate of two quarts of molasses to a half-barrel; work it with the emptyings of beer, or with yeast if you have it. After working sufficiently, bung up the cask, or, which is better, bottle its contents.

To make Molassesbeer. Take five pounds of molasses, half a pint of yeast, and a spoonful of powdered ginger; put these into a vessel, and pour on two gallons of scalding hot *soft* water; shake the whole till a fermentation is produced;

then add of the same kind of water sufficient to fill up your half-barrel. If the cask be greater or smaller than this, the component parts must be in proportion. Let the liquor ferment about twelve hours; then bottle it, with a raisin or two in each bottle.

If honey instead of molasses be used, at the rate of about twelve pounds to the barrel, it will make a very fine beverage, after having been bottled a while.

To make Beer with Hops. Take five quarts of wheat-bran and three ounces of hops, and boil them fifteen minutes in fifteen gallons of water; strain the liquor; add two quarts of molasses; cool it quickly to about the temperature of new milk, and put it into your half barrel, having the cask completely filled. Leave the bung out for twenty-four hours, in order that the yeast may be worked off and thrown out; and then the beer will be fit for use. About the fifth day, bottle off what remains in the cask, or it will turn sour, if the weather be warm. If the cask be new, apply yeast, or beer-emptyings, to bring on the fermentation; but, if it has been in this use before, that will not be necessary.

Yeast, particularly the whiter part, is much fiter to be used for fermenting, than the mere grounds of the beer-barrel; and the same may be observed, in regard to its use in fermenting-dough for bread.

To recover a cask of stale Smallbeer. Take some hops and some chalk broken to pieces; put them in a bag, and put them in at the bunghole, and then stop up the cask closely. Let the proportion be two ounces of hops and a pound of chalk for a half-barrel.

To cure a cask of ropy Beer. Mix two handsful of bean-flour with one handful of salt, and stir it in.

To feed a cask of Beer. Bake a rye-loaf well nutmeged; cut it in pieces, and put it in a narrow bag with some hops and some wheat, and put the bag into the cask at the bunghole.

To clarify Beer. For a half-barrel, take about six ounces of chalk, burn it, and put it into the cask. This will disturb the liquor and fine it in twenty-four hours.

It is also recommended, in some cases, to dissolve some loaf-sugar and add to the above ingredients.

We omit going into any description of the method of making strongbeer, as the necessity for it among Farmers, as a household beverage, seems to be greatly obviated by that of smallbeer, which is much less intoxicating, and by cider, a stronger drink, which is readily afforded from apple-orchards, which are more or less natural to almost every part of the United States, except a little of its southern border, where the grape can be cultivated to advantage.

It is indeed true, that many Farmers in Greatbritain brew their own strongbeer; but there is but little of that country where apple-orchards are natural, either to the soil or the climate; and hence, as a substitute for cider, this drink has been resorted to. It is an expensive liquor for the Farmer to make much use of, as it requires four bushels of malt to make a barrel, even of common ale, and eight, for a barrel of beer of the strongest kind.

BEES. Every hive must have its Queenbee; and if she be taken away, and cannot be replaced by another, or a new one brought forth, in the manner hereafter to be mentioned, the Swarm soon quit their labors and become extinct. The Queenbee is the Mother of the whole; as well of the succeeding Queens, as of the working Bees, which are much the most numerous in every hive, and of the Males, or Drones, which do not work. The eggs for each kind are laid in cells particularly intended for their reception. The Queen, or Mother, is about a fourth larger than the Workers, and an eighth larger than the Drones: She has a much larger and longer belly, and is of a darker color, than the rest.

The only apparent use for the Males is for impregnating the Queen; and yet but one out of the whole performs this office. On some fine warm day, early in Summer, she leaves the hive for this purpose, mounts out of sight in the air, is gone some considerable time, and, if successful in accomplishing the purpose of her flight, returns with evident marks of impregnation; the genitals of the Male being left in her.

When the Males are no longer of use, for the purpose of impregnation, or rather in the month of August, they are fallen upon by the Workers, dispatched by their stings, and thrown out of the hive.

If the Queen is not impregnated, until after the expiration of twenty days from the time when she first comes from her cell, she will produce no other eggs than those for Drones all her life; and she will begin to lay in the cells intended for them in forty-six hours after her impregnation.

But, if impregnated before she is twenty days out of her cell; then, in forty-six hours thereafter, she commences laying eggs successively for the young Queens, and for the Workers, in the cells intended for them respectively, and at the rate of about two hundred a day, for about eleven of the succeeding months; when she commences laying eggs for Drones, in the cells intended for them.

The cells for bringing forth the Workers, and the Drones, are the hexagonal holes of the combs. These are begun at the uppermost part of the hive, and extend perpendicularly downwards, so that the cells lie horizontally. After they have been used as the depositories of the young brood, they are cleaned out, and made the receptacles of the honey, and of the bee-bread; and, when emptied of these, in the course of the ensuing Winter, are again used the next season for bringing forth new broods of Bees.

The cells for the young brood of Queens are placed in the uppermost part of the hive, and hang perpendicularly.

The young brood of Larvae, or Worms, which form the future Workers, and Drones, are fed in their cells, by the Workers of the hive, with pollen or the farina of flowers, which they gather and bring home in yellow masses attached to them on each side; and of this the bee-bread is also composed. The food of the Worms intended for Queens is different from this, being a kind of paste or jelly, of a pungent taste.

The eggs for all the three kinds of Bees are hatched in three days. A Worker then remains five days in the vermicular state; a Male, six and a half; and a Queen, five. The Worker's Worm occupies thirty-six hours in spining its silken envelope or coccoon; in three days it changes to a Nymph; and only on the twentieth day of its existence does it become a perfect winged animal. The Drones are still longer in attaining this last metamorphosis, which takes place in twenty-four days after the eggs for them are laid. The Queen comes to perfection in sixteen days.

The coccoon of the Workers, and Drones, covers them entirely; that of the Queens covers only the head, thorax, and the first ring of the belly, leaving the most vulnerable part open to the attack of its Rival, which may soonest acquire a perfect state of existence, and be let out, by the Workers which guard her, from her cell. But, where a Queen is formed from the brood of the Workers, she is enveloped entirely in the coccoon, it being then indispensably necessary that, while in this state, she should be secure from all attacks.

The rearing of a new Queen happens when the reigning one is lost, and no other is to be found in the cells of the Queens to be brought forth. As soon as this discovery is made, the hive becomes a scene of tumult and disorder; and destruction seems to be anticipated by the Bees, by the precautions they take to guard against a disaster of this kind. Should there be no eggs or brood in the combs of the Workers, the Swarm must perish; their instinctive faculties then seem to be lost; they cease to collect honey and prepare wax, and soon disappear. But, if there be brood in the combs, their usual labors are continued.

Having selected a Worm of three days old, or less, they sacrifice three of the contiguous cells, that the cell of the Worm may be formed into one adapted for a Queen. In the mean time, the Worm is fed with the jelly before mentioned, and at the expiration of three days they proceed to alter the cell into an upright one. When the Queen has reached maturity, the seal of the cell is broken, and she comes forth qualified to fulfil every function on which the preservation of so many lives depends.

It would therefore seem that the Workers are imperfect Females in their organization; and this is further evident, from the fact that some of them lay eggs, which, however, produce no other Bees than Drones.

Honey is the food of Bees: It is a vegetable secretion, which appears at different seasons of the year, and particularly when flowers are in blow. The Bee licks it from these with its proboscis; the honey is swallowed; and on returning to the hive it is disgorged, not from the trunk of the Bee, but from its mouth, into the cells. Into some of these honey for daily use is put; while that put into others is sealed up, and reserved for times of necessity. Many of the Workers free themselves of their collections before reaching the hive, by bestowing them on others; and for this purpose the trunks of these are seen extended, and they receive the honey into them as it is disgorged.

The wax is afterwards formed from honey; and when the Bees swarm they always carry enough of it with them to construct some combs. They can also form these from sugar, as has been proved by experiments made for the purpose. The yellow matter with which they return laden is composed of the farina of flowers, which is the food for the Young of the Workers, and Drones, as before mentioned; and also of a resinous matter, called propolis, which is used to line the hive, and stop its crevices. The propolis is also used to cover any offensive insect or animal that may get into the hive, and which they cannot remove after killing; such as, snails, &c. In this case, the covering they put over it prevents its becoming offensive and contagious.

The Queen that has become a Mother is treated with much more consideration and respect, than before this event has taken place. She is, nevertheless, the Leader of the first Swarm that leaves the hive in the season. She exhibits the first symptoms of the swarming that is about to ensue. She becomes greatly agitated; runs about among the rest, and communicates to them the same feeling as she passes along; drops her eggs at random: Those coming in loaded neglect to unload themselves, but run precipitately about, as the tumult becomes more general. At length, the whole, partaking of the impulse, rush to the outlets of the hive, and the Queen along with them. This is an event that only happens in clear weather, and during the warmest part of the day.

On issuing from the hive, they do not generally appear to have any place of settlement in view. The agitation produced soon raises the degree of heat among them very considerably; and it may be this circumstance that at last induces them to leave their dwelling. They will, however, return to it, if the Queen be taken away.

They often resort to a place unsuitable in point of convenience, and unfit for their preservation. After rising in the air, it is commonly some tree that arrests their progress; and the Queen frequently alights at the extremity of a branch; where the Bees which may have formed in clusters in the vicinity come to surround her. Sometimes they will swarm in the grass, near the hive they have forsaken; though there may be trees at no great distance.

Sometimes all the precursors of swarming, disorder, and agitation have been exhibited; when a cloud passing before the sun has restored tranquility to the hive.

When more than one Swarm leaves the hive in a season, those following consist of the Bees which were abroad when the first event took place, together with the young ones which have come from the eggs laid by the Queen, before her departure. Each succeeding Swarm is led out by a young Queen, as there are several royal cells in the hive; but the cell that contains the oldest of the royal blood is always opened first; as Bees seem to have an idea of the right of succession, and a knowledge of the one on whom it should fall. Sometimes, however, two young Queens will be found in the hive at once.

If the Swarm be not removed from the place where it settles, it soon commences its labors; and the same may be observed, if it be removed to an empty hive. Cells or combs are soon constructed of wax from the honey the Bees have carried with them; and the first eggs laid will be those of the operative part of the Community.

Having gone thus far into the natural history of Bees, something is now to be said of the best means of managing them.

The method practised in this Country is, to have rows of beehives set close together, in a building made for the purpose, which is called the bee-house. The apiary, spoken of by British Writers, seems to be quite different from this; as the hives are recommended to stand six, some say twelve, feet apart; and to be firmly fixed in a stake set into the ground. We have, however, never seen any particular advantage pointed out, by having the hives so far apart; while the expense of the apiary must, in this way, be much greater, as every hive must have its separate roof or covering. We shall therefore speak of the apiary, or beehouse, as we have it in this Country.

It should be at a suitable distance from any place where cattle are kept, or where Horses are tied; from hogsties, and every other place where filth is collected. It is well to place it in a remote part of the garden, and let some shrubery grow round it for the Bees to light on, if they are so disposed, when they swarm. No trees should be near it. Let it stand leaning forward a little, facing the south, and clear of shade, with the front part of the roof projecting over considerably, to prevent rains from weting the hives. These should be kept clean, dry, and sufficiently warm in Winter; but not so warm as to tempt the Bees abroad in warm Winter-days.

The species of Swallow called Martins will destroy Bees; of course, no harbor should be afforded for these birds. Some say that the common Swallow and the Redbreast, will also destroy them; but this is rather doubtful.

It is advisable to have large Swarms; small ones never thrive so well; and for this purpose two or more small ones should be put together. The Swarm should weigh from four to six pounds. To ascertain their weight, that of the empty hive should be first known, and marked on it; and then the addition to that will be the weight of the Bees, when put into it. The weight of each is readily to be known by the steelyard.

For joining two or more Swarms, take a full hive, at night, and set it bottom upwards; then set an empty one of the same size with its bottom exactly on the other, and let there be cross pieces in the empty one for the Bees to light on. Then strike gently on the two sides of the full hive to which the edges of the combs are fastened, and the Bees will leave it and ascend into the upper. Then repeat the operation with another full hive, the one with the Bees in being set uppermost, as before, and you have two Swarms together. Repeat it again, as before, and you have three; and so on, if more Swarms are to be added. Then set the hive with the Bees in it where one of the full ones stood, and they will go to work together. The Queens must, however, be first searched for, and all destroyed but one.

Another method recommended is to take a full hive, set it on a cloth with the bottom downwards, and then give it a smart stroke, which will cause all the Bees to fall; search for the Queen and destroy her; have another full hive ready, and put it over the Bees, and they will soon crawl up into it, and become incorporated with those of that hive.

This may also be repeated, for the purpose of adding a third Swarm to the other two.

Lest any one should want faith, however, in these methods of joining Swarms, we will add the directions given by Mr. *Thorley*, for the purpose, which, though attended with some more trouble, appears to be perfectly practicable.

He directs that the Bees should be first stupified with the smoke of the dried mushroom, found in the fields, which is commonly called *Puff-ball*. It is first to be compressed, and then dried in an oven till it will retain fire.

The hives intended to be joined are to be placed with their bottoms over two empty ones, when a piece of puff set on fire is to be placed under each full hive, so that the smoke will ascend into them; and, when the Bees have become stupified, let the full hives be knocked gently on the sides, and the Bees will fall into the empty ones in a torpid state; when one of the Queens is to be searched for and killed.

The two Swarms are then to be mixed together, and droped in among the combs of one of the hives, and set away where that hive stood. The entrance into it is to be covered with a cloth, to prevent their geting out. Let the hive into which they are put be first examined, to see if it contains a sufficiency of honey for both Swarms.

The second day after their union, remove the cloth, in the dusk of the evening, and they will sally forth; but, on account of approaching night, will soon return. Keep them confined three or four days, leting them out in the evening, as before, and then the cloth may be removed.

Swarms may also be divided, in order to increase the number; and this is to be done before the usual time of swarming, or when brood is in the hives, which is about the time the trees are in blossom. Three or four pieces of comb, having brood in them, are to be cut out, and placed, in rackwork, in an empty hive, in the same position as when taken out; then take, say, 500 Bees from another hive, and put them into this, and close it up, and keep it in a place where the temperature is moderate.

Violent agitation will ensue among these Bees; then silence; then still louder noise: But, after the second day, they will begin to construct the Royal Cell. On the fourth or fifth day the hive may be carried into the garden, and the prisoners suffered to escape, which they will quickly do; but in about two hours they will return, and in due season bring forth the new Queen. This requires about fifteen days, and during that time the Bees should have honey, sufficient for their subsistence, given to them every other day.

We have before observed, that Bees in swarming often appear to have no place in view to remove to; but at other times the case is different. In such case, after leaving the hive, they will rise to some height in the air and go off in a straight direction, sometimes to the distance of two or three miles, to some place apparently before selected for their future residence, which, in this Country, is commonly some hollow in a tree.

When this happens, it is usual to attempt to prevent their flight, by producing confusion among them, by loud rattling noises, and thus bring them down and cause them to settle. For this purpose, firing off a gun among them is said to be most efficacious. Throwing sand or fine gravel among them is also recommended; the Bees, mistaking the sand for rain, are suddenly disconcerted. Whatever is done in these ways should be done quickly, and effectually, or it will probably be disregarded by the Bees.

If they get fully under way, for the place of their destination, they are hardly to be arrested in their progress. They may be followed, if the Pursuer can keep in sight of them; and brought back, if not lodged in the hollow of a tree, or other inaccessible place. If they light on a branch of a tree, for instance, after they have settled, the branch may be gently cut off and laid on the ground; and then the hive, supported on two sticks, is to be set over them, and the whole covered with a sheet, when they will soon ascend into the hive and commence working.

In the evening, when all is still within, the hive is to be brought to its place in the beehouse. Let them settle where they will, after swarming, they are to be got into the hive in this way, or as nearly so as the circumstances of the case will admit, and set to their place in the evening.

It is said by Mr. *Bonner*, that after they have settled they may be taken up in handfuls, and put into the hive. We should, however, advise to previously fortifying the hands with leather gloves. A case is mentioned by Mr. *Thorley* where the Bees lighted on the head of his servant Girl, and remained there, without stinging her; and that, on finding the Queen and seizing her and some others, and puting them into the hive, the rest, on missing her, soon followed in crouds and took possession of the hive.

In dealing with Bees, care should be taken not to breathe on them, as nothing is more irritating to them; while, at the same time, they take no offence at being blown on with a bellows. Where they are to be scraped together, make use of a feather for the purpose. It is advisable to fit your dress to them, by puting on clothes through which they cannot sting; and to protect the face, and particularly the eyes, by a pair of goggles; though many neglect these precautions, without sustaining any injury. Bees are certainly much less inclined to sting, when swarming, than usual; and, if gently dealt with, may then commonly be handled with safety.

If two clusters of Bees form in swarming, and remain separate, a Queen will be found in each; and as no Swarm that leaves a hive is ever too large, one of the Queens must be destroyed, and then the Bees will all unite. In cases of this kind, it would seem that the Queen last released from her cell is let out a little too soon, and before her Predecessor has had time to go off with a Swarm, and by this mean the younger Queen goes off with the rest.

If a Swarm has been destitute of a Queen for as much as twenty-four hours, they will receive a new one that is a Stranger; but, if offered to them at first, she would be rejected by them and put to death.

The hive should be proportioned to the size of the Swarm; one therefore weighing from four to six pounds should have a hive that will contain about three pecks. In this Country, hives are commonly made of boards or of straw. The former we believe to be as good as any, and must be used for the management we would recommend, which is as follows:

The hive is to have a hole in the top, say, two inches square, which is to be covered with a sliding shutter; and is to kept closed until the hive is filled. When this is the case, which is to be known by the Bees lying inactive about its mouth, open the hole above, by drawing the shutter back, and set a small hive on the top, into which the Bees will ascend, and fill it with the purest honey, and whitest comb, without any mixture of bee-bread.

When the upper hive is full, take it off in a cool morning, when the Bees are inactive, and carry it into a room with the windows open to the morning sun, and as this enlivens them they will fly off to the hive left standing, to join their companions in filling another small hive, which is to be placed on the top, as before. When this is full take it away, and put another in its place, which, in due time, is also to be taken away; closing the shutter, and leaving the lower hive for the Winter-food of the Swarm.

The upper hives should be sufficiently large to contain about seventeen pounds of honey, which the Bees, if the Swarm be as large as it should be, will usually fill about three times in the season.

In taking out the honey from these small hives, which should be done speedily, let those Bees which are found unable to fly be thrown into a vessel of cold water, so contrived that they can crawl out again, and they will soon recover their wonted activity, and go after their companions.

In this method of managing, it will be seen, that there is no necessity for the process of fire and brimstone for geting rid of the Bees; a procedure equally cruel and destructive of the race.

Another method of taking the honey, without killing the Bees, is by driving them out of the full hive, at night, into an empty one, with its bottom set on that of the other, in the manner we have before mentioned; and then, seting the latter in the place where the former stood, they will soon go to work again. This method is said to be considerably practised in France.

Mr. *Deane* recommends a method of management, which should also be described; though we consider it inferior to that we have just recommended.

He directs that three hives, fourteen inches in diameter, and ten high, be set one on the other; the two lower ones having holes in their tops, and sliding shutters, as before mentioned. Each hive is also to have a place of entrance for the Bees. The holes of the two lower hives are to be open at the commencement of the season, when the Bees will first fill the upper hive.

When full, close the shutter below, and take this hive away, and treat it in the manner before directed, and the Bees will proceed to fill the next hive below. When this is full, take it away, as before, and close the aperture in the top of the lower hive, and the Bees will then proceed to fill that with honey, which is to be left for their Winter-food.

Mr. *Deane* says that this method prevents the Bees swarming; but in this, we believe, he is mistaken.

What induces us to prefer the plan we have recommended, is the purity of the honey and comb, as before stated, and its freeness from any mixture of bee-bread. The comb is very thin and transparent, and the honey is perfectly clear.

Another sort of beehive is recommended in the Edinburg Encyclopedia, as being much approved in Scotland.

This is a hive with a number of leaves joined together, like the leaves of a book; each leaf being a frame, or piece of lattice-work, sufficiently wide to hold one comb, and no more. The hive is to be composed of a suitable number of these leaves, which, like the leaves of a book, may be opened at any place, in the front part, and the combs, formed in any of them, taken away; which vacancy will be soon filled again by the Bees. On opening these leaves, the Bees are found to be very civil, or rather fearful; owing perhaps to the sudden influx of light which is thus occasioned.

The principal advantages of the leaf-hive seem to be, the facility it affords for taking away a part of its contents, at pleasure, and for examining the condition of the Bees, in regard to their stock of provisions, their health, and whether they are free from troublesome insects. Of these particulars, something shall now be said.

Were we merely to consult our feelings, we should advise to feed Bees, when their stock is exhausted. If this be near the close of Winter, interest alone will dictate the measure; but, if they are found destitute at an earlier period, perhaps their destiny is only to be averted from motives of compassion. And is the industrious Insect, that toils for us incessantly during Summer, unworthy of pity in the hour of distress? It should be remembered, that, when even a little Bee perishes with famine, it 'feels a pang as great, as when a Giant dies.'

But another Writer, quoted by Mr. Deane, says that Swarms, 'which have not a good stock of honey to serve them through Winter, are not fit to keep.'

Honey is the most natural food for Bees. It is to be conveyed into the hives by little troughs for the purpose, and the food is to be given daily, until the Bees can provide for themselves. Let some good sweet-wort be mixed with the honey, and it will then go much farther. Sugar, or molasses, may also be used in place of honey. A Writer, quoted by Mr. *Deane*, says,

'Some prescribe toasts of bread, soped in strong ale, and put into the hive; whereof they will not leave one crumb remaining.'

This is certainly much the cheapest food.

The quantity of provisions, the Bees may have in store, is to be known by the weight of the hive. The weight of the Swarm, and of the hive or box containing them, should always be known, and marked; and then, after a reasonable deduction for the weight of the comb, the remainder of the whole weight must be honey and bee-bread. The hive composed of leaves, as before described, affords, however, a readier way for ascertaining the stock of provisions, by opening the leaves and examining every part; and this we think one of its principal advantages.

Perhaps the leaf-hive, with a hole and shutter in the top, for the purpose of filling the small hives, as first mentioned, would be found an improvement combining the advantages of each.

In regard to the diseases of Bees, it may be firstly observed, that epidemics have been known to prevail among them, and sweep them off almost entirely; that a case of this kind happened, about forty years since, in Syria, in the Archipelago, as is related by the Abbe *Della Rocca*. Such instances are very rare, however. The most common disease among them is a kind of diahoea, which is very injurious; the commencement of which may be observed by the foulness of the combs. These should have the foul parts pared and scraped off.

It is said by some, that the disease may be cured by supplying the Bees with a mixture of rosemary and honey, diluted with water. Others recommend for the purpose a syrup of equal quantities of sugar and wine, with a little nutmeg grated in; and by others, a mixture of honey, sugar, and wine is prescribed. These medicines are also advised to be given, when the Bees appear dull and languid, owing to a disorder of the antennæ.

But what has lately proved most destructive to Bees, in this Country, is an insect, which is the spurious tinea, while in its caterpillar form. It is a species of moth, and is thus described by *M. Reaumur.*

'These creatures are of the caterpillar kind, and have sixteen legs. They feed on wax, and for food enter the beehives; where they boldly engage the Bees, and are not to be prevented by them from feeding, though at the expense of their habitations; so that it is no uncommon thing for a Swarm of Bees to be forced to change their place, leaving this contemptible victor in possession of the hive.'

'All the Authors who have writen on Bees, have complained of this destructive animal. It never eats the honey, but feeds only on the wax; attacking principally those waxy cells where the female Bee deposits her eggs for the future progeny.'

'The Bees would readily destroy these creatures, were it not for the armor they are covered with. They form themselves a coat of armor of a double matter. The first, next to the body, is a kind of silk of their own spining; and the outer covering is of beeswax, laid on considerably thick. The creature, just thrusting its head out to feed, goes on devouring the cells; while the Bees are buzing about him, attempting, in vain, to pierce him with their stings. He never forsakes his covering; but lengthens and enlarges it as he goes; and, gnawing down the sides of the cells in his march, without staying to eat them one by one, the destruction he occasions is scarcely to be conceived.'

'When its time of change approaches, it contracts its body within its double covering, and there changes into the nymph state; whence, after a proper time, it comes forth in the form of a moth, with granulated horns, and a crooked proboscis.'

'The Bees know their enemy in this new form, and destroy all the moths they can meet with. They are seldom so fortunate, however, as to kill the whole race as soon as produced; and, if only one escape, it is able to lay a foundation of revenge for the death of its Brethren.'

'All the flies of the moth kind lay a vast number of eggs; and the young ones produced from those of one surviving female, of this species, are sufficient to destroy many honey-combs; nay, many hives of them. The moth produced by this caterpillar flies but little; but is very nimble in avoiding danger by runing, which it does with great swiftness.'

This insect has been extending its ravages from south to north, for several years past, and in its progress must soon pass the northern bounds of the United States. Probably, like many other insects, its existence will be only temporary. Mr. *Van Schaick* says,

'In the county of Greene, where I first observed it in 1813, the havoc it spread throughout its course was wide and annihilating.'

'In a single instance, one Farmer had upwards of thirty hives destroyed that year.'

'In 1815, I observed it in the counties of Renselaer and Saratoga, when it first made its appearance there, where its ravages were equally destructive.'

'On inspecting a number of hives (says he) I found its eggs deposited in every part of them, but most generally, and in vast numbers, under the rims, and in the crevices of the floors or stands, nearest to the hives; as if the little insect had anticipated the wants of its progeny, and determined to fix it where its sustenance should be abundant. But in doing so it does not appear to act solely for the benefit of its offspring; for, whilst the worm destroys the wax, and detaches the honey from the cells, the fly devours the latter, where it can do so with impunity.'

He adds, 'On examining several hives, I have found caterpillars and chrisalides, and the remains of each in large clusters, enveloped in webs suspended therein, and apparently the only tenants which occupied the desolated hive.'

'The great desideratum (as he well observes) is how to destroy the tinea, or how prevent its intrusion into the hives.'

For destroying it, he observes, 'the most effectual method which I have yet observed, is to raise the hive about an inch above the floor and prop it there, when, the moment the Bees discover their unmasked enemy, whether in the shape of eggs, or of caterpillars in different stages of formation, they attack them with fury, and toil incessantly until they have destroyed or removed every vestige of them off the board.'

He further very judiciously recommends the construction of the floor or plank on which the hive stands, and also the rim of the hive, to be 'of such materials and dimensions, as would afford no place of concealment for the fly or its eggs.' For these purposes, therefore, let the plank be planed smooth, its cracks all stoped, and then either painted, or white-washed with lime; and then let the rim be pared off to an edge, so that it can afford no covering underneath, between the edge and the plank. Let the edge be also painted, and its cracks stoped.

With these precautions, and with the further improvements, suggested and put in practice by Dr. *Low*, which we shall now mention, we are fully convinced that the ravages of this, and every other creeping insect, upon the hive, may be effectually prevented.

His method is to suspend the hive, by a cord fastened in the top, and have the plank forming the floor moveable up and down. During cold weather, the plank is brought up close to the rim, to keep the Bees sufficiently warm; but on the approach of Spring, or when the weather has become suitably moderated, the plank is let down about four inches, and kept in that situation during the warm or growing season. At particular cold spells, during the first of the Spring, or latter end of the Fall, the floor, no doubt, ought to be raised up, until the return of warmer weather; but it should only be kept in this position while the comfort of the Bees requires it.

Two further advantages are mentioned by Dr. L. as being gained by this treatment. The hive has always sufficient fresh air within, so as to save the labor of some of the Bees, which are aloted in every close hive to perform the business of ventilation; and, the bottom of the hive being entirely open, the Bees are not impeded by each other, in coming in or going out.

Dr. L. also found one of his hives infested with ants, which were lodged between boards forming the bottom. Most probably these insects make their incursions into the hives at night; as he says the Bees quickly routed them, as soon as their hidingplace was discovered.

Some years since, when the caterpillar was making great ravages in Newjersey, a Writer, in a Morristown Paper, recommended raising the hives, and strewing fine salt under the rims, which he had tried for two years with complete success. We have been informed, however, that others have not met with the same success in making this trial.

Another formidable enemy of the Bee is mentioned by some European Writers, which is the insect called the *Sphinx Atropos*. It is said to prevail against the working Bees, by making a clacking kind noise, which, for a while, it would seem, deprives them of the power of resistance; for it is said the Queen also possesses the power of making this noise, which disarms the Workers for a while; and that on hearing a similar sound, from the insect in question, it produces a similar effect, and gives the animal a chance of preying on the honey.

But, as we believe this insect has never made its appearance in this Country, we will refer those of our Readers to the Edinburg Encyclopedia (article Bee) who are desirous of having a particular description of this enemy of Bees.

Wasps and hornets also prey on the contents of the hive; and should therefore have their nests destroyed, whenever found any where near the beehouse.

Sometimes Bees turn Robers; and those owned by one will be found carrying off the honey, from the hives belonging to another, to their own dwellings; and in that case the Bees of the emptied hives are said to follow.

Whether this be a matter of conquest on the one side, or of consent on the other, is perhaps difficult to say; but, where the Owner of the deserting Bees finds this to be the case, which is to be known by the sudden desertion and emptying of his hives, perhaps his best remedy is to remove his remaining Swarms to another neighborhood, for the season, or change his stock of Bees.

Those which are the Robers may be traced to their dwellings, by scattering a little flour over them, as they leave the hives from which they carry the honey, and observing their course as they go off.

Bees thrive best, and collect most honey, in the neighborhood of flowers; and the nearer to them the better. Buckwheat, while in blossom, affords excelent food for them. Broom, clover, mustard, and the flowers of the poppy, afford them good pastures. The flowers of mignonette are much relished by them, and give the finest honey. Mr. *Bromwich*, a British Writer, relates that he planted a quantity of it before two beehives, at a considerable distance from any other Bees; and, with such abundant supplies as this afforded them, few ever left the garden where the mignonette grew.

In September, he took the honey, and found it to exceed, by above a third, what he obtained from any other two of his best hives, where the Bees were obliged to fly farther; and that the honey was equal in fragrance and color to what is imported from the warmer climates.

For the purpose, therefore, of having the Bees as constantly as possible where they can have the easiest access to their food, it is the practice in some countries to carry them from place to place, in search of fresh, or of the earliest, flowers; and this is done both by land and water.

On the Nile, they are sent up, in boats constructed for the purpose, to where the flowers are earlier in bloom; and return again in two or three months, stoping frequently where the feeding is best. Along the shore of Asia Minor, they are carried in boats, from one island to another, in search of food. In France, they are transported, both by land and water, for the same purpose.

A case is mentioned by M. *Reaumur*, of a M. *Protaut*, who kept about six hundred hives, which he moved, by land, twenty miles or more from home, in search of the best feeding. From thirty to forty-eight were carried in one cart, made for the purpose; the hives being properly arranged in tiers, and standing on strong cloths, fastened to springs. They traveled slowly, and on the smoothest roads; and frequently halted where the feeding was good.

But we shall not further enlarge this article, with relations of what is done in old settled Countries, where, labor being cheaper than it is here, the Cultivator of Bees is enabled to make that profitable which, perhaps, might not be found equally so in this Country.

Bees are certainly very profitable, if properly managed, and attended to. They, however, require more attention than is usually bestowed on them here. We have endeavored to give the general outlines of their natural history, and of what is considered to be good management of them, without entering too minutely into details, which are inconsistent with the intended brevity of this Work.

Our Country is probably not calculated to support so many Bees, as one that has less of woodland, and more land that is cultivated. The forests yield but little food for the Bee, except the honey-dew, as it is called, which at times is found very plentifully on the leaves of trees. This, however, affords but indifferent honey; and probably, when this dew abounds in the forest, the leaves of the plants of the cultivated fields are not wholly destitute of it.

There can be no doubt, however, that almost every part of our Country, where it is cultivated, is capable of feeding six times the number of Bees with which it at present abounds.

BEET *(Beta.)* There are varieties of beets; but the best are the red, and the reder the sweeter. Sow them early, if the soil be not very rich; but they may be sown later, where it is strong. The soil should be well mellowed to a good depth. A soil naturally mellow is best for them. The larger they grow the farther they should be set apart, even to the distance of twelve inches. The seeds generally come up double, but should be separated while young, otherwise both roots will be small, and sometimes twisted round each other. Those taken out may be transplanted; yet they will make but short roots. Beets should be kept clear of weeds, till the leaves covering the ground prevent their further growth.

The roots should be dug up before any severe frosts; none of the fibrous roots should be taken away; nor should the tops be cut close. In this situation they should be boiled, to prevent any loss of their juice. In Winter, they are best kept in sand; and they should not be suffered to freeze, as this makes them tough and unfit for use.

Sugar is made from this root, and for this purpose the white beet is prefered. They are washed, and boiled soft; when the juice is pressed out, by a screw-press, and then boiled down to a consistence proper for graining: It is then poured out into flat pans, made for the purpose, and gently stired while it is cooling. In order to render it more dry, and white, it is put into the screw-press, and there severely pressed; by which operation the molasses is forced out, leaving the remainder almost as white as lump-sugar. The molasses may be again boiled down and converted into sugar, as before, or it may be kept for use.

We mention this use of the beet here, from a belief that either it, or the pumpkin, may afford the cheapest sugar to all those who are soon to inhabit the vast praires of the West, which form nearly half of our territory; where the sugar-maple abounds but little, and where much of the soil is admirably calculated for the culture of this root. It is almost useless to say, that it will afford ardent spirits as readily as it will sugar.

See further, MANGEL WURTZEL. Probably this may be found best adapted for the purpose of making sugar.

BOG-MEADOWS. Where these are not a turf, but a mere loose black dirt, and can be well drained, having then a sufficient depth, they make valuable lands, particularly for the purpose of raising hemp. The drier this land can be laid the better. When this earth is carted out upon upland, it is found a good manure; and upland, particularly gravel and sand, when carted into bog-meadows, is almost equally beneficial. Prodigious great crops of herds-grass have been raised on them, when thus manured with upland earth: And if this be so beneficial for grass, why not equally so with hemp? It would seem, that not only grass and hemp, but many other productions, such as Indian corn, potatoes, cabbage, carrots, beets, turnips, parsnips, and perhaps almost every grain but wheat, might be cultivated to great advantage on well-drained boglands, where they had been previously well manured with upland earths. The Indian corn, however, must be such as has been long cultivated in a more northerly climate, and, of course, ripens so soon as to escape the early frosts which prevail in bog-meadows. Hops are cultivated to great advantage in these lands.

The method of draining these lands effectually is, first to run a ditch through the middle, and draw off as much of its waters in this way as possible. Where the meadow is very wet and miry, you commence at the *lowest* part of the ground, where you design its outlet to begin; and thence carry the ditch into the meadow, sinking it all the way as you proceed, as low as will barely give the waters a current to run off; and the deeper this ditch can be sunk the better. Then run a ditch proportionately deep all round the edge of the bog, for the purpose of cuting off all the springs. Then cross-ditches are to be made, in number and size proportionate to the extent of the bog, and of the size of the middle and surrounding ditches. Generally speaking, the deeper and larger your ditches, the fewer cross-ditches you need have.

It should be remembered, that boglands will settle down very much, after draining; for which due allowance ought to be made, in regard to the depth of the ditches. Sometimes it may be found, that there will, after draining, be too thin a layer of bogdirt above the clay on which it is bottomed, to be of much value; and, foreseeing this, it ought in some cases to deter the Proprietor from going to the expense of draining the swamp, particularly if it be covered with a thrifty growth of timber.

See further, DITCHES.

BORECOLE OR COLESEED (*Brassica rapa.*) We give the directions, for the culture of this plant, from the *Gardener's Dictionary.*

'This plant, which is generally known by the name of Rape or Coleseed, is much cultivated in the Isle of Ely, and some other parts of England, for its seed; from which the rapeoil is drawn: And it has also been cultivated, of late years, in other places, for feeding of cattle, to great advantage.

'The coleseed, when cultivated for feeding of cattle, should be sown about the middle of June. The ground should be prepared for it in the same manner as for turnips. The quantity of seed for an acre of land is from six to eight pounds; and, as the price of seed is not great, it is better to allow eight pounds; for, if the plants are too close in any part they may be thined, when the ground is hoed; which must be performed in the same manner as is practised for turnips, with this difference only, of leaving those much nearer together; for, as they have fibrous roots, and slender stalks, so they do not require near so much room.

'These plants should have a second hoeing, about five or six weeks after the first, which, if well performed in dry weather, will entirely destroy the weeds, so that they will require no further culture.

'When there is not an immediate want of food, these plants had better be kept for hard weather, or Spring-feed, when there may be a scarcity of other green food. If the heads are cut off, and the stalks left in the ground, they will shoot again early in the Spring, and produce a good second crop in April; which may be either fed off, or permited to run to seed, as is the practice where this is cultivated for the seed. But, if the first is fed down, there should be care taken that the cattle do not destroy the stems, or pull them out of the ground.

'As this plant is so hardy as not to be destroyed by frost; so it is of great service, in hard Winters, for feeding of Ewes: For, when the ground is so hard frozen, as that turnips cannot be taken up, these plants may be cut off for a constant supply. This will afford late food, after the turnips are run to seed; and, if it is afterwards permited to stand for seed, one acre will produce as much as, at a moderate computation, will sell for five pounds (about twenty-two dollars) clear of charges.'

The same Author adds:

'The curled colewort, or Siberian borecole, is now more generally esteemed than the former; being extreme hardy, so it is never injured by cold; but is always sweeter in severe Winters than in mild seasons.'

Mr. *Deane* says:

'A Gentleman informs him that, in Boston, he made several trials of this plant, and found that the Winter did not injure it. It is fit for the table from December to April.'

Mr. D. says:

'He made trial of three kinds of borecole, the last year, in the latitude of 44. It grew very well till Winter; but not one plant in fifty had any life in the following Spring. The sorts were the green, the white, and the red. But it is probable that in some parts of Newengland, and in warm situations, this plant may be cultivated to advantage; though not in fields, it may in gardens.'

It is believed that this plant might be advantageously cultivated, in the middle and more southerly States.

BOTWORMS. The manner in which these are produced is this: An insect somewhat resembling a Bee in its head and neck, having a long crooked tail, may be seen during the months of Autumn, almost constantly flying about Horses; and in the course of a few weeks will fill their hair, particularly about the breast and legs, with great numbers of its nits. Whenever the Horse itches in any part, he applies his teeth for the purpose of scratching: In doing this he loosens some of these nits, and they are received into his mouth; whence they pass with his food into the stomach, and from these the Bot is produced. Experiments which have been communicated by Mr. *Livingston* put this matter out of doubt.

To kill Bots in a Horse, pour a quart of rum down his throat. This will make them loose their hold of the maw, and they will be carried off with its contents. Repeat the dose as often as may be found necessary. A few doses of linseed oil, a pint each time, will also quickly effect a cure.

Another effectual remedy, we have seen recommended, is, to take a spoonful of unslacked lime, at a time, and mix it with the food of the Horse, morning and evening, for three or four days, which will completely expel these insects.

BUCKWHEAT (*Polygonium.*) The product of this grain depends much on the wheather, while the growing crop is in blossom; for, if the days are moderately cool at that time, it may be expected to fill well and be abundant; but it may be otherwise, should there be much warm weather at that time. Sixty and seventy bushels to the acre are sometimes raised of this grain, where the growth is sufficiently thick and heavy on the ground; but ofttimes the crop, for want of filling properly, will not yield a third of this amount.

It should be sown at such time, as it will just ripen before the Fall-frosts are usually to be expected. Half a bushel is about a proper allowance of seed to the acre. The crop will grow with more indifferent culture than, perhaps, any other. It is much assisted by gypsum, where that manure is suitable to the soil. Even to wet the seed before sowing, and then to dry it with a sufficient sprinkling of that manure, will greatly assist the growth of the crop.

It is considered excelent for Bees, while the crop is in blossom. It may be cultivated yearly on the same ground, and to considerable advantage, on light lands of no great value, but which are suitable to gypsum, as a manure. It would seem that it might be raised, with some profit, on much of that great tract of light mellow level land, which extends to a greater or less distance back from the Atlantic, in the southern States.

For the article of bread, it would be a very agreeable substitute for Indian corn, which is the grain principally used in that country for that part of aliment. Indeed, the principal excelence of Buckwheat is for making an agreeable bread; for the cakes made of its flour, if eaten while warm, are generally much relished; and, for the purpose of bread, the same weight of flour of this grain will, perhaps, go farther than that of any other whatever. When ground, or steamboiled, buckwheat is also good for feeding and fating Swine, and other animals.

The crop, when ripe, is cut with a cradle, and let lie in the swath a few days to dry. It is than raked in small bunches, which is to be done in the morning, to prevent its shelling too much. When sufficiently dry, and during the driest part of the day, it is drawn, either to the barn, or to the centre of the field, which, in some places, is the most usual practice, and threshed out immediately. It is very easily threshed with the flail, while dry. Indeed, the crop is easier raised, harvested, and threshed, than perhaps any other.

We cannot recommend the culture of this grain, on lands which are suitable for more valuable crops; but, on light smooth lands particularly, the Farmer may find considerable account in keeping a field, of a few acres, for a yearly crop of buckwheat, as well for family-use as for assisting in fating his Swine, &c. A bushel of gypsum to the acre, or perhaps less, applied yearly to the ground, would be found sufficient to keep it rich enough for good crops.

BULL. *See* NEAT-CATTLE.

BURN-BAKING. A method of manuring stiff clay lands. It is performed by paring off the sward, in pieces about eighteen inches long, a foot wide, and two or three inches thick; these are set on their edges, leaning against each other, to dry, which in good weather requires about three weeks. They are then laid up somewhat in form of ovens, with their mouths to a common windward side, having a hole in the top of each for the smoke to pass off. In a dry day, when the wind blows into the mouths, they are set on fire with straw, and if they burn too briskly some earth must be thrown on to deaded the fires. At the end of about three days they will be completely burnt through; and then the burnt earth is spread over the ground and ploughed in with a shoal furrow.

See further, WEEDS, for another use of BURN-BAKING.

For cuting up the swards in squares for burn-baking; a roller with sharp iron rims round it, at suitable distances, is to be used. As the roller passes over the ground the rims sink into it sufficiently deep. The ground is first to be cut one way with this implement; then with another implement, resembling a wheel-plough, it is cut into squares, by crossing the direction of the roller; and the squares are at the same time severed underneath by a broad thin share for the purpose, and are turned over in the manner of turning over sward-ground. They are then to be set up, as before directed.

Mr. *Young*, the late famous Agriculturalist, of Great-britain, recommends burn-baking, where it can be easily performed, as highly beneficial to cold, stiff, and clayey soils.

BURNT CLAY. This is a good manure for clay and other heavy soils. In '*The Complete Grazier*,' it is also recommended for light soils. The method of preparing it is as follows:

In the first place, dig your clay in spits of the size of bricks, and let them be well dried in the sun. Take small billets of wood, or faggots of brush, and pile them up in the form of a sugarloaf, three or four feet high; then pile your spits of dried clay closely round this, leaving a hole on one side to kindle the fire, and another in the top for the smoke to pass off. Surround the pile again with two more enclosures of the spits of clay, and then kindle the fire. When it has goten well on fire, stop up the holes with clay, and the innate heat will so fire the mass, that wet clay may be thrown on in great quantities. Care must however be taken, not to lay it on so fast, nor so closely, as to put out the fire, as in that case you must begin anew. By raising a stage round the pile, you may throw on clay till you get it as high as you please. The pile must be watched day and night, till fully burnt.

Farmers possessing clay-lands will do well to make experiments of this manure. From ten to twenty loads of it is a suitable dressing for an acre.

BUTTER. For curing butter, take Dr. *Anderson*'s recipe, as follows:

'Take two parts of common salt, one of brown-sugar, and one of saltpetre; beat them together so as to blend them completely, and apply one ounce of this to every pound of butter; work it well into the mass, and close it up for use.'

This will cost about a cent per pound more than by curing butter in the usual way; but its peculiar excelence is, that butter thus cured will keep sweet for two or three years; and its taste is much superior to that which is cured in the common way. It must not, however, be used sooner than a month after it has been laid down, as it does not fully acquire its rich marrowy taste, until about that length of time. Butter cured in this way and laid down for Winter-use, will then be found worth at least twenty-five per cent. more than that which has been cured with salt alone.

Dr. Anderson condemns the practice of keeping milk in leaded vessels, and butter in stone jars, as communicating to the milk, and to the butter, a poisonous quality extremely injurious to the human constitution.

To prevent the rancidity of common salted butter, Mr. *De Witt* very judiciously recommends making it into rolls, and keeping it in a pure brine in a cask, with a lid and dasher, somewhat similar to the common churn. The dasher is for the purpose of keeping the rolls under the brine, which is effected by means of a cord tied at one side of the vessel, run over the head of the handle of the dasher, and then tied down at the opposite side. The brine does not penetrate the butter, and therefore may be made strong; and, to keep it pure, it may be occasionally heated, and the scum taken off, which will clarify it.

Country Merchants, who take in butter, by attending to this, may preserve all their Spring and Summer butter sweet for the Fall market.

To make the finest butter, take the *last* fourth-part of the milk of each teat of the *best* Cows for making butter, and make it by itself. The first part of the milking, which contains much the least and the poorest of the cream, can be made into inferior butter, or used for other purposes.

Butter made in the month of May is observed to be the best for keeping.

C.

CABBAGE *(Brascia.)* There are many varieties of this plant, such as the common white and red cabbage, the Dutch, the Scoth, the Savoy, the Winter-green globe, the brocoli, the borecole, the Battersea, &c. The oil called rapeoil is made from the seeds of the borecole, or *rape*, as it is sometimes called.

In Greatbritain, the cultivation of cabbages is a part of field-husbandry, and they are used for feeding and fating cattle.

Cabbages require a soil made rich, but the kind is not so material. Mr. *Young* makes mention of good crops raised in red sand. Rich swamp-lands, well drained, are good for them. They will grow yearly on the same ground; but they exhaust the soil considerably. For field-culture, the plants are to be set in rows four feet apart and about two feet from each other, and ploughed and hoed like other hoed crops. Transplanting is the most advisable method, though the seeds may be planted at first where they are designed to grow. Strewing soot, ashes, or lime round them, while young, will assist considerably in keeping off the insects which usually attack them. Where they are liable to become club-footed, by reason of worms which eat into their roots, a small trifle of salt strewed round them is good.

When cabbages are fed to Milch-cows, the decayed leaves must be taken off, or they will impart a bad taste to the milk and butter.

Where a field-crop of cabbages is to be raised, or an early crop for the table, the seeds for the plants should be sown very early in the Spring; where the crop is designed for Fall and Winter-use, the seeds may be sown later; but, as the proper time for this must still depend on the climate, it is a matter that is best learned by experience.

Cabbages for Winter-use should be pulled in dry weather, and be well dryed before they are put into the cellar. Let them be hung up in the cellar, with the heads downwards. The cellar should not be too warm, or they will soon rot. They may also be kept well during Winter, by cuting off the heads and laying them away in a cask filled with snow, and keeping them in a cold place.

But, for the Spring-supply, let a trench be made in a dry soil and line it with straw; set the heads closely together with the roots upwards; cover them with straw, and then with earth, piled up as steep as possible. In this manner they will keep till May, and may occasionally be dug out as they are wanted.

CALVES. *See* NEAT-CATTLE.

CANKER. *See* FRUIT-TREES.

CANKER-WORM. *See* INSECTS.

CARRIAGES. Some of the best British Farmers principally use one-horse carts, instead of wagons, on their farms. Mr. *Young* particularly recommends them for this purpose, as being on the whole more convenient and cheaper. In Ireland, the wheel-car is almost universally used on farms, and for transporting on the highways. On these, one Man is found sufficient to drive four cars; the Horses, being under good command, follow each behind the other. Each Horse draws from ten to twenty hundred weight, according to the state of the roads; for it is found that one animal drawing by itself, in a car or cart, can as easily draw eight hundred weight, as two can draw twelve hundred weight, when put together in a wagon. The reason of this is obvious: In a cart, the Horse carries a part of the load on his back; and, in drawing, his exertions are not baffled by the jostling and unequal exertions of another. Carts are, however, more easily upset in bad roads than wagons. Another objection against them is, that they press too heavily on the Horse or Oxen, when going down hill, particularly when carrying a top-heavy load; and they incline to tilt up behind, when going up hill with such load. These defects are, however, easily obviated by a contrivance fixed in front of the box, for the purpose of raising its fore-end when going down hill, and of sinking it when going up; so that, in either case, the centre of gravity of the load will not be materially altered from what it is on level ground.

A cart contrived and used by Lord *Somerville*, in Great-britain, answers this purpose in part. Another contrivance of that Nobleman is, a wooden bar placed on the outside of each wheel, just above the hubs, so that when going down hill the bars are drawn by each end against the sides of the wheels, so strongly as to impede their motion, and thus prevent the load pressing forward with more force than is convenient. A description of the means by which these several operations are performed is here omited, because they are, perhaps, nearly as easily imagined as described. Any one, wishing to test their efficacy, need not be long at a loss for the means.

The cart-wheels made use of by the above Nobleman and others are of cast-iron, being about three feet in diameter, with a rim about four inches broad: The spokes are flat, and broadest where they join the hub and the rim, so as to give them most strength where most is wanted. If any part of the wheel happen to break, by a too violent concussion, it can be mended again with wrought-iron, when it will be as strong as ever. The axletree is of wrought-iron. Such a cart may last an age, with good usage, and the cost of them is not so great as that of carts made of wood. Probably they would, however, be found too brittle on stony lands; though their strength will be found very great, if cast of the best metal to be had for the purpose.

In the construction of the body of the cart, the essential points are to fit it for the purposes for which it is mostly to be used; to place so much of it before the axletree as that, when filled, about a fifth of the weight of its contents will rest on the Horse; and that it be so contrived as to be tilted up to empty its load.

The improvements above mentioned, for regulating the centre of gravity of the load, and for impeding the progress of the carriage in going down hill, may be equally well applied to our ox-carts.

The wagons generally used in this Country, whether for one, two, or more Horses, are, perhaps, as convenient as those to be found elsewhere: All that is particularly insisted on is, that, according to the experience of the best British Farmers, the one-horse cart should be prefered to the wagon on smooth well-cultivated farms, as being cheaper, and more convenient for most uses.

Whether the wheels of carts be made of wood or of cast-iron, the rims should be as much as four inches broad; by this mean they sink less into the earth, and therefore run more safe and steadily. Their being low, and placed pretty wide apart, also renders the cart less liable to upset.

Carriages should be constantly shielded from the weather, when not in use: The Summer sun cracks and shrinks the wood, and wet weather tends imperceptibly to decay it, and to waste the parts which are of iron by rust.

For the best method of seasoning timber for carts, wagons, &c. see TIMBER.

Wagons and carts may be made to run at least one-fifth easier, by having iron rollers in the boxes. This, at the same time, saves the trouble of taring the axletrees. A plan has been patented for wagon-boxes with rollers, which has the rollers held at equal distances, by having each end fixed in a rim or ring; so that, as the rollers run round in the inside of the box, the ring turns with them, and thus prevents any friction by the rollers geting out of their places. If four or five dollars a year can be saved by the easy runing of a carriage, by being enabled to carry, perhaps, a fifth more at a load, it is well worth while to be at the additional expense of four or five dollars, in the first instance, to fit the carriage for this purpose.

CARROT (*Daucus.*) There are few articles of culture more profitable than that of carrots. They will yield, with the best cultivation, from six to eight hundred bushels an acre.

They require a mellow soil, into which they can easily penetrate deeply. They will grow very well on one which is moderately rich; provided it be well and deeply mellowed. A fertile sand, a sandy loam, a dry warm loam, or a fertile gravelly loam, are each suitable for them, with proper manuring and cultivation. The ground ought to be ploughed till it is perfectly mellow, and as deep as possible, not less than eight inches in depth, if you expect the best crops. The land should be perfectly free of stones. It is best to plough but one way; not to cross-plough; for this is only necessary in rough hard ground, for breaking clods and other obstructions to the plough; but, for the mere purpose of mellowing land, cross-ploughing is not more efficacious than constantly ploughing one way. In this way, where you make the parting-furrow, you begin the next time to make the back-furrow, and thus you keep the depth of the earth that is stired by the plough equal, which is essential to the equal growth of carrots. The ground ought to be ploughed in this way in the Fall, and then but little will be requisite to prepare it in the Spring. After ploughing in the Spring, it ought to be finely harrowed, and then it will be fited for the reception of the seed.

The sowing is performed, either in the broadcast way or the drill. In the former, the seed is covered with a rake instead of a harrow, to prevent its being covered too deep. The first hoeing being gone through, after they have arrived to a suitable size, the ground is all harrowed over; and they are then to be gone over again, for the purpose of uncovering those which the harrow may have covered: This is also a proper time for thining them where they are too thick; they should stand from about four to six inches apart. They may, however, be thined after this, when they have got to some size; and then those which are puled out may be given to the Hogs, as they are very fond of them, and will readily eat both roots and tops. As soon as they have got so large that the tops will cover the ground, they will stop the further growth of weeds. For Neat-cattle and Hogs, they cannot be too large; and therefore ought to be sown as early as the fore part of May, if the ground and season will admit: They will, however, do very well when sown as late as the latter end of May, and such are the best for culinary purposes.

The garden-hoe is proper for working among them: It must be sharp for cuting weeds, and about four inches wide; and on the other side of the handle is fixed four small prongs, similar to those of a dungfork, for the purpose of stiring up the ground.

Drilling, or sowing in rows, would be much the best, were it not for the tediousness of the operation. The seed must be droped into the rows by hand, unless some drill-machine can be devised by which to commit them to the earth more rapidly. This, probably, might be done, notwithstanding the seeds are so badly shaped for that purpose. If they were first rubed smartly together, so as to make them of rounder shape, then made wet with lye or brine, and dried with gypsum, and this repeated till the seeds should become encrusted; they might then probably be managed successfully in a small hand drill-machine, which may be easily contrived for the purpose.

The first hoeing of drill-rows, after ploughing between them, requires considerable hand-labor; after which it may be performed almost entirely by the horse-hoe or cultivator. (*See* Horse-hoe.) The rows are to be thined, so that the carrots when grown will be about an inch apart.

The best way to keep carrots through the Winter, for family-use, is to bury them in moist sand. In this way, they may also be kept for feeding out to Horses, Cows, Hogs, Sheep, &c. and a cellar for the purpose might be made in a side-hill, covered with earth, and otherwise fortified against the frost, to be sufficiently warm for that purpose.

For the best method of boiling carrots for feeding Hogs, &c. *see* Steam boiler.

CATERPILLARS. *See* Insects.

CATTLE. *See* Ass, Foals, &c. Goats, Horse, Mares, Neat-cattle, Sheep, and Swine.

CHANGE AND IMPROVEMENT OF SEEDS. Most plants are found to degenerate to a certain degree, unless their seeds are frequently changed. This has been attributed to their cultivation in climates where they are not indigenous. But this can hardly be the sole reason; for it is found that most plants will be improved, by having the seeds brought from the east to the west, and *vice versa*.

Providence, in making so large a world as this, seems to have designed that there should, nevertheless, be a common acquaintance among the Nations which inhabit it. They are invited abroad, for conveniences which their own climates do not furnish; they are impeled to a general intermixture, from a knowledge that is is beneficial; and the benefits, to be derived from a change of seeds, are probably only in furtherance of the general design of a Community among Nations.

But we are yet much in the dark, as it respects the best changes of seeds, and from what parts of the world they should be brought, to produce the greatest crops. Ought not this to become a matter of more general concern? The Irish Farmers sow our flaxseed, and find great account in it. Would their flaxseed be equally beneficial, when sown here? We have known flaxseed brought fom Longisland, and sown in Orange county, which produced nearly double the crop which the common seed there produced. Spring-wheat brought from Canada, and sown here (Herkimer county) greatly enhances the crop; but soon degenerates. Siberian wheat yielded largely in this Country, for a while. The seeds of apples brought from Europe will produce trees larger than our own. For roots, it is generally supposed that seeds brought from a more southerly climate are best. Indian corn, brought far from that quarter, will be in danger of ripening too late: That brought far from the north will ripen too early for a large crop. On the whole, the Farmer should make his changes as judiciously as possible; and in most instances he will then find the product of his crops greatly increased.

But, in order to prevent seeds from degenerating, by long use, we are of opinion that the plan pursued by Mr. *Cooper*, of Newjersey, will be found effectual; though we believe that seeds, improved according to his plan, would undergo a further improvement, by a suitable change of place.

His method is to make frequent selections of the most *perfect* plants of every kind, and to cultivate the seeds of these, by themselves, for the purpose of raising new and improved stocks of seed of every kind; and further, when he raises seeds of plants, of which there are different *species*, he is careful to set or plant them as much as one hundred yards from each other, in order that in propagating they should not mix breeds, and thus produce spurious or degenerated seeds, partaking more or less of the qualities of each plant.

Seeds are also sometimes susceptible of improvement. by growing *varieties* of the same plants together, for the purpose of obtaining seeds of a medium between the two. But we will further illustrate these matters.

Thus, in making selections in wheat, for instance, search for such heads as have the largest seeds, and the greatest number in each head. In Indian corn, of any particular variety, for stalks of good size, with the greatest number of ears on each, and the ears the largest, most perfect of the kind, and best filled. In flax, for the longest stalks, and such as have, at the same time, seeds of good size. In pumpkins, for such stalks as bear the greatest number, and these the largest, and sweetest. In short, in making the selections, take the most perfect and valuable plants to be found, of whatever kind is wanted, and from each of these raise the progeny that is to serve as the stock for seed of the different plants to be cultivated.

In many kinds of plants, such as Indian corn, pumpkins, &c. the selections may be yearly repeated, without any essential inconvenience. In others, such as wheat, barley, &c. yearly selections would be too expensive. In such, let selections be made, say, every eight years; and from the seeds of the plants thus selected raise a yearly stock, sufficient to serve for seed. The more constantly the selections are made, however, the more valuable may the products be expected from such seeds.

In regard to the means, just mentioned, for preventing a degeneracy of seeds, by the intermixture of different *species* of the same plant, we will state a case. Of the *Brassica* tribe of plants there are different *species*, and also *varieties* of two of these, *to wit;* cabbages of several varieties, common turnips of several, and the cabbage-turnip, or ruta-baga, of which there are no varieties. The Cabbages are valuable for their heads, or leaves; the common turnip, for its bulbous root; and ruta-baga, for its bulbous stalk.

Now, if seeds for ruta-baga, and for cabbages, were constantly raised beside each other, the consequence would be, that the bulb of the former would become less, and its foliage more extended; while the head or foliage of the cabbage would lessen, and its stalk become somewhat bulbous: And if all the species and varieties of the plant were constantly grown together, for seed, they would gradually become more assimilated, and the most valuable parts of each, of course, lessened in product.

But sometimes an improvement of seed is to be effected, by growing varieties of the same plant together. Of Potatoes, for instance, there are many varieties, some preferable for one particular quality, and some for another; some for greatness of product, and others for mealiness, and fineness of taste; and, in such case, by growing them together, a race is produced which, in part, partakes of the good qualities of each.

The same may be observed of many other plants; and in some instances, perhaps, improvements might be made, by blending the most valuable qualities, of plants of different species, together.

Such, we conceive to be, the doctrine of Mr. *Cooper;* and we are of opinion that, in general, it is well founded. Mr. C. also contends, and we think with much truth, that there is a natural disposition in all seeds, or plants, gradually to become habituated to the soil, or climate, in which they are grown.

CHANGE OF CROPS. Lands are least exhausted by a judicious change of such crops as are most suitable to the soil. Some lands are well suited for a great variety of crops; some, only for particular growths, or for a few plants. Some plants may be constantly raised in particular soils, without essentially exhausting them; and some require a constant change of ground, to grow to any advantage.

Flax, in particular, cannot be fully grown on the same soil, oftener than once in seven years. Rye, on the contrary may be raised for twenty years, or more, on grounds most suitable to its growth, if the stubble be turned under as soon as the crop is harvested. Certain crops are more suitable than others, as preparations for certain other crops.

Generally speaking, changes of leguminous, culmiferous, and root-crops are most advisable, in soils which are well adapted to the growth of a variety of plants; such as the rich sandy, sandy loam, gravelly loam, dry mellow loams, and those with a large mixture of vegetable earth.

We will, however, designate such soils as abound most in this Country, and the changes which may probably be found as well adapted to each as any others.

1. A light redish sandy soil. This has naturally but little moisture, or other food of plants, until it has additions of more retentive earths, and other suitable manures. It is commonly too dry for Indian corn. First crop, turnips, well manured in the drills with a compost suitable to the soil. Second, peas, with some gypsum applied, but not so much as to make the crop run too much to haulm. Third, rye, with red cloverseed harrowed in with a light harrow in the Spring, which operation will be of some service to the crop. The two following years, clover, with a light dressing of gypsum, after each mowing.

The last crop may stand for seed; and let so much of the crop as includes all the heads of the grass be taken off with a sickle, and turn the rest under immediately; and let the ground lie, to begin again with turnips the next year; or, if the sward can be turned under sufficiently early, as in more southerly climates it may, a crop of wheat may be raised on this clover-lay to advantage; and then begin again with turnips.

2. A dark-colored sandy soil. Such are generally fertile and well adapted to the growth of Indian corn, which, together with potatoes, may be the first crop; then turnips; then wheat, if the turnips can be taken off sufficiently early; then clover, managed as before; then another crop of wheat, as before; and then begin with Indian corn and potatoes again. Or barley may come in after the turnips, with the cloverseed sown at the same time.

3. A sandy loam. This may have various degrees of fertility, according to the sand and the loam of which it is composed; but, generally, a rotation similar to the last mentioned will answer very well.

4. A dry loam. Some of these soils are well fited for crops of Indian corn, and perhaps for turnips. Generally, the mellow reddish-colored looms will be found best adapted for these crops; and, where this soil is found suitable

for them, the rotation may be similar to that last mentioned. With the aid of gypsum, crops of Indian corn may commonly be raised to advantage on such soils.

Or, sometimes, the first crop should be potatoes, well manured with dung; then Indian corn, manured with gypsum; and, when the ears are somewhat hardened, let the crop be cut up and carried off the field, to be set in shocks to ripen, and the ground put in with wheat, and clover to be sown in the Spring, as before. In some cases, perhaps, a crop of pumpkins might precede the wheat-crop, to advantage; though this must in a great measure depend on the quantity of pumpkins that can be raised on any given quantity of ground.

See PUMPKIN.

5. A wet loam. The extent of the rotation, that can be profitably pursued on lands of this description, must depend much on the degree of superabundant moisture they contain. Where they are quite wet, but few crops can be raised on them, to advantage, except grasses. Such lands are greatly improved by hollow-draining.

See HOLLOW DRAINS.

Where they are but moderately wet, however, several kinds of crops may be successfully grown on them, especially if the ground be raised in ridges; though these are calculated more readily to injure the land, by washing the best parts of the soil away by heavy rains, if it lies considerably descending. In such case, it is most advisable to carry the ridges in such direction as will give them but a moderate descent.

Such grounds are not suitable for roots, though potatoes may be raised on them to some advantage. This may be the first crop; and, in such case, let the ground be sufficiently mellowed with ploughing, and then very shallow furrows run for forming the beds in which to lay the dung; and when the seed is laid it may be covered with a furrow of a one-horse plough, run on each side, so that in this way the growing roots will be more elevated than is necessary in drier soils.

By throwing up the ground in high narrow ridges, after the potatoes are taken off, the fermentation may more readily be kept up for the crop of the next year. In this state of the ground, a crop of Indian corn may often be raised to advantage, by mellowing the ground in the Spring, and planting on ridges to be raised by two furrows thrown up against each other.

Let the ground be thrown up in ridges again in the Fall; and the next Spring sow it with oats, barley, or Summer-wheat, according as the ground and the climate may be most suited for one or the other of these crops.

Good crops of flax may also be raised in such soils; and they are naturally suitable for Winter-wheat, where they are sufficiently dry to enable that crop to withstand the Winter-frosts.

With the third crop grass-seeds should commonly be sown, which should be those of timothy or some other kind calculated to withstand the frosts of Winter in such soils. Clover, no doubt, will answer where the ground is sufficiently dry for Winter-wheat. When the grasses begin to fail, let the ground be broken up again. Oats, well harrowed in on the sward, when this is properly turned over, will often answer well for the first grain-crop in such soils.

6. Dark-colored dry loams. The darkness of the color is commonly owing to a large proportion of vegetable earth being mixed with the loam in such soils; and, as vegetable matter is calculated to fertilize soils, those of this description are commonly well adapted to the growth of almost every plant, and an extensive rotation of crops, which may be similar to those mentioned for a dry loam. They are not always so good for wheat, however, as some of the stiffer soils, which have less vegetable matter in their composition; nor so good for turnips, as some fertile sandy soils.

7. Dark-colored wet loams. These being also largely mixed with vegetable matter, are often better calculated for several growths of roots and grain, than the wet loams before mentioned. They are, generally speaking, most natural for many kinds of grasses, and for a more or less extensive rotation of grain and root-crops, according as they may be more or less retentive of moisture. Hollow-draining may often be found a great improvement of such soils, where they are quite wet; as well for the most of grasses, as for crops of roots and of grain.

8. A gravelly soil. This is commonly a poor earth for culture; but more or less so, according to the proportion of gravel it contains, and the sort of stoney matter composing the gravelly ingredient. A fine schistic gravel may sometimes be found quite productive. Generally speaking, however, hard gravelly soils are best adapted to crops of rye and red-clover, alternately; and with the aid of gypsum, for which manure this soil is peculiarly adapted, and with deep ploughing, tolerably good crops of each may be constantly raised. With the aid of gypsum, good crops of buckwheat may be had from gravelly soils which are naturally very sterile; and this, instead of rye, may be the intermediate crop between those of clover, from which the most profit is to be expected.

Saintfoin may also be grown to considerable advantage, on hard gravels. See GRASSES. But on fine schistic gravelly soils, and those approaching more to the character of that of which we shall next speak, crops of potatoes, Indian corn, and even tolerable growths of wheat, may be had, in rotation, beside clover, with the aid of gypsum and other suitable manures.

9. A gravelly loam. There are various degrees of fertility to be found in this soil, according to the quality of the loam, and the kind and quantity of gravel contained in it: But, generally speaking, it is a soil properly calculated, with the aid of gypsum, and other suitable manures, for a rotation, say, first of potatoes, then Indian corn, followed by wheat in the Fall, after the crop of corn has been cut up; or, barley in the Spring, and then clover. Some of the mellower and richer sorts of this soil may also answer well for turnips, carrots, and other roots, and generally for almost all kinds of crops suitable for dry upland soils.

10. Clayey soils. Real stiff clays form but a small proportion of the arable lands of this Country; though there is a considerable portion of them that have more or less alumine in their composition. The more obdurate soils of this description, when long manured with lime, and other ingredients, lose that adhesion which renders them so unpleasant in cultivation, and they then become more assimilated to loamy soils.

Clays, in their original state, are unfriendly to the growth of root-crops, and some of them are too retentive of water for crops of wheat; but, if they are sufficiently dry, they are well adapted for this grain, and tolerably well for oats, barley, red-clover, timothy, and some other grasses; though, for all the natural meadow-grasses, the weter clays are best. Stiff clays, being but little assisted by gypsum, do not possess the advantages common to most other soils in this Country, which are powerfully aided by this stimulant.

The extent of any rotation of crops, on clayey lands, must depend much on the proportion of clay they may contain. If clayey soils be sufficiently dry, with a proportion of calcareous or silicious earth mixed with them, they may be then well suited for rotations of such culmiferous and leguminous crops as may be found most advantageous; and also, for some of the root-crops, particularly potatoes. The rotation in such case may be similar to that for dry loams, substituting the potatoe-crop for that of turnips.

If the soil be merely a stiff dry clay, the first crop may be oats, well harrowed in on the sward properly turned over: Such, at least, is a common and successful practice in Greatbritain. As soon as the crop is harvested, turn the stubble under; and in the Fall throw up the ground into high narrow ridges. In the Spring, cleave these down and prepare the ground for barley, and manure the ground with a compost, suitable to the soil, before this crop is sown. Plough up the ground again, as soon after harvesting as possible; put it in wheat in the Fall; and, in the Spring, harrow in clover and timothy-seed. After the crops of grass begin to fail, begin the rotation with oats, as before.

In England, the bean-crop comes in as a part of the rotation in clay soils; but probably it would not answer so well in this Country; or at least this would seem to be infered, from the circumstance that this culture has never been introduced here; though probably it might be found beneficial on farms where clays entirely abound, as neither peas nor Indian corn can be raised to advantage on such soils.

Where stiff clays are too wet for wheat, they admit of but little change; and should be kept mostly in timothy or other grasses suitable to the soil. The changes may be oats, and then Summer-wheat, or perhaps barley, as before mentioned.

It is difficult, however, to designate particularly the most suitable changes of crops for every soil; as they are more exactly to be ascertained by the known products of lands, when properly cultivated. But such crops, in rotation, as are found to yield most clear profit, and are at the same time best suited to follow each other, should usually be cultivated, after making due allowance for the greater exhaustion of the soil, occasioned by the growing of some than of others.

Generally speaking, the leguminous and the root-crops, with the exception of potatoes, are the least exhausting. Rye is the least of a scourger, of the culmiferous crops, and perhaps Indian corn the most so. The root-crops, and particularly turnips, are to be recommended for the profits they usually afford; for their being less injurious to the ground; and for their being good preparatives for other crops.

There are several others, not here mentioned, which, in many instances, may be found advisable to cultivate; and sometimes it may be best to follow the almost exclusive cultivation of certain plants, which may be found best adapted for particular pieces of land.

CHEESE. For making this article, take the following directions: Make your milk blood-warm, and put in your runnet; but no more than will just make the curd come. Add an ounce of fine salt to so much curd as will make a cheese of fifteen pounds, and in that proportion for a greater or less. Stir the curd till it is gathered; put it in a strainer, and with your hands work out all the whey; then lay it in a clean linen cloth, put it in the hoop, and, covering it with the cloth, put it in the press, and let it stand there two hours; then take it out, rub it over with fine salt, put it in another dry cloth, and put it in the press eight hours; then take it out again, put it in another dry cloth, and put it in the press again, where it is to remain till the next cheese is ready.

When taken out of the press, put it in brine twenty-four hours, and let the brine have as much saltpetre in it as will lie on a shilling. Some little additions of salt and saltpetre must be occasionally made to the brine; and let it be cleansed as often as necessary, by heating it and taking off the scum. When you take the cheese out, dry it with a cloth; bind it round with a long string to make it keep its shape, which must be kept round it for some days, and let it be daily turned on the shelf, for two months.

Let the evening milk be put with that of the morning; and, to make the best cheeses, let none of the cream be taken away. If the evening milk, however, be skimmed, and added to that of the morning, it will make tolerable cheese. Skim-milk cheeses are also made; but they are not worth much.

The method of making the much-admired Stilton cheese, in England, as communicated by Mr. *Monk*, is as follows:

'Take the night's cream and put it to the morning's milk with the runnet. When the curd is come, it is not to be broken, as is done with other cheeses; but take it out with a soil-dish altogether, and place it in a seive to drain gradually, and as it drains keep gradually pressing it, till it becomes firm and dry; then place it in a wooden hoop; afterwards to be kept dry on boards, turned frequently, with cloth binders round it, which are to be tightened as occasion requires. The Dairy-maid must not be disheartened, if she does not succeed perfectly in her first attempt.

'In the dairies which I visited (says Mr. Monk) the cheeses, after being taken out of the wooden hoop, were bound tight round with a cloth, which was changed every day, until the cheese became firm enough to support itself. After the cloth was taken off, they were rubed every day all over, for two or three months, with a brush, and, if the weather was damp or moist, twice a day; and, even before the cloth was taken off, the top and bottom were well rubed every day.

'There is no doubt (says he) but those cheeses require a great deal of attention, owing to their richness and thickness. They run from eight to eighteen pounds.'

They are never better than when about a year old. They sell in England from twelve to fourteen pence sterling per pound.

But no good cheese can be made, unless the runnet be good.

See RUNNET.

The room where cheeses are to be kept for drying should be dark, to keep out flies; and, to prevent these from depositing their eggs in the cracks of the cheeses, let them be smeared over with a mixture of salt butter and tar. To give them a fine color, let a little annotto be put in the milk. This is harmless: But beware of coloring them with any thing that is poisonous.

The whey, after the curd has been gathered, is nourishing for Swine. It may also be converted into good vinegar, by being exposed to the sun, for a few days; and this is, no doubt, the most profitable use to which it can be applied.

CHURN. A good kind of churn is the oblong square, which is turned on two pivots by a crank. The pivots are not placed in the centre of the two ends; but one is placed at one side of the end, and the other at the opposite side of the other end, so that the churn is suspended *diagonally* on the pivots. This, when it is turned, gives the milk a violent motion from one end of the churn to the other; while, at the same time, it turns very easily. The churn ought to be about of the following proportions: One that is three feet long ought to be one foot wide one way, and about nine inches wide the other way; so as to form a *flat* oblong square. The pivots are made of iron, and are riveted on the outside. A square hole is made on one side, for leting in the milk, and taking out the butter; and a square piece is made exactly fited to fill up the hole, which is fastened down to its place by a little iron bar across it, with a staple at each end.

Another kind of churn, that is much approved, is the barrel-churn, which is turned on pivots, fastened on the centre of each end. Two boards, like shelves, are fixed within, opposite to each other, extending from the inner circumference about half way to the center; and as the vessel turns the milk keeps pouring off the one or the other, and thus is kept in violent motion. It has a hole at the side for puting in the milk, and taking out the butter, similar to the one just described.

Either of these kinds of churn is much easier worked, than those in common use.

Some, who keep large dairies, make use of a Horse for churning. In this case, the churn is an upright one, nearly similar in shape to those in common use, and, instead of a dasher, an upright piece with the lower end set in the bottom of the vessel, and extending through its lid, having two wings full of holes within, is turned round, with sufficient velocity, by means of a cogwheel and trunnelhead, similar to those of a gristmill.

A churn of this kind might also be turned with a sweep, by hand, or even by wind-machinery, when the winds blow. *See* WIND-MACHINERY.

If the winds should not blow when the churning should be done, and the particular time for this is not very essential, the work might be done by a Horse, or by hand.

We offer this with some reluctance, however; for fear of being thought more theoretical than practical.

An improvement in the dasher of the common churn has also been made, by which that kind of churn is considered by many to be, for common purposes, equal, if not superior, to any in use.

The dasher turns on the handle, by being fixed to it by a pivot. The dasher is merely two cross-pieces, say, three inches square, put together, by being let into each other, which then form four wings. These are cut beveling on each side, at an angle of forty-five degrees, so that they stand diagonally; the whole being very similar to the wings of the little windmills (so called) which are set up, on poles, to be turned by the wind.

As this dasher goes down, in the milk, it turns one way, on its pivot in the lower end of the handle, and as it comes up, it turns the other way; and this produces an agitation of the milk, better calculated for producing the butter, than any method ever yet known. It is so efficacious in its operation, that the churning must be performed moderately, or the butter will come too soon, and be *swelted*, as it is technically called by some.

Mr. *Fisher*, the Inventor of this dasher, obtained a premium in England, for the discovery. The churning with this dasher is not attended with that splashing of the milk, so troublesome in the churn with the common dasher.

Oak is generally prefered for churns, as pine is apt to communicate something of its taste to the butter.

CIDER. To make the best cider, there are several requisites. The apples should be of one sort, and of the best kind. They should be perfectly sound, ripe, and clean. Those which are shook from the trees by a gentle shaking are best; and all knoty, wormy, and roten ones should be rejected. Such as are not of this prime rate may be made into common cider.

The apples thus selected should be spread on a floor, raised from the ground, with a cover over it, and the sides enclosed. Here they are to lie for the purpose of sweating. They should lie about four or five days, when the weather is dry and warm; but longer, when wet and cool; and let them be dried, by exposure to the sun, the roten ones thrown away, and ground immediately in a clean mill.

When the cheese is made, it should stand about twelve or fourteen hours, before the press is put upon it; for this delay in pressing will greatly improve the cider.

The best plan of making the cheese is, to cut off the but ends of the straw, and lay it along on the four sides, with the cut ends projecting out about four inches, on each side, beyond the extent intended to be given the cheese: Then, with a strait smooth board, made for the purpose, about five inches wide, and of sufficient length, you commence forming one side of the layer of pumace, by building it up compactly against the board, which is set upright on its edge. When that side is formed, take away the board, and in the same way proceed to form the next, and so on till the four sides are built up. Then lay on another layer of straw, as before, and proceed with the board to build up the four sides of the next layer of pumace, and thus you proceed building up the cheese as nearly perpendicular as possible.

In this way, the cheese, by having the straw to lap well in the middle, or centre, is in no danger of bursting open in pressing, as is often the case when large cheeses are made in the common way, with the straw brought round the outside of each layer of the pumace. We have seen cheeses made, in the manner here recommended, large enough to run off twenty-four barrels of cider.

The first and last runing of a cheese should be put by itself, as it is not so good as the rest. In pouring the cider into the cask, let there be a strainer of coarse cloth in the bottom of the funnel, to keep out the pumace. New casks, or those which have just been emptied of brandy, are the best. If old casks are to be used, it is of the utmost importance to have them perfectly clean. When they are first emptied, they should be well washed, and then bunged up tight. For want of this precaution, they often become musty, and then they spoil all the liquor afterwards put into them.

The only successful method of cleansing musty casks, we have ever heard of, is that communicated by M. *Lenormandes*, which he learned of a French Peasant, as appears in 'The Annals of Arts and Manufactures,' published in France, and is as follows:

'Make up in quantity what will be equal to about a sixteenth-part of what the cask to be cleansed will hold, of the following ingredients, *viz.* about four pounds of common salt, and one of allum, added to a mixture of water with Cowdung fresh droped from a *Cow* (no other will answer); put the whole in a pot and heat it almost to boiling, stiring it constantly; pour it thus heated into the cask, and shake it well, turning it round on every side, and continue shaking it every hour or two, taking out the bung while shaking, lest it burst.

'When its contents have become cold, pour them out, and rinse it clean; then pour in some hot water, in which about two pounds more of salt, and one of allum, have been dissolved; shake the cask well on every side, as before, and while the water is yet warm pour it out; drain the cask, and bung it up tight, till wanted for use.

'This (says Mr. L.) will not only make the cask perfectly sweet, but will even restore wine to sweetness again, that has been injured by being put in a musty cask.'

When casks have more or less of a sour smell, Mr. *L'Hommedieu* directs to take at the rate of about a pint of unslacked lime for a barrrel, put it in, and pour in three or four gallons of hot water, or more for a larger cask; shake it well on every side, giving it some vent, as before mentioned; let it stand till cooled, and then rinse it with cold water. Repeat the operation, if the cask does not then smell perfectly sweet. Most probably, a suitable quantity of wood-ashes would more effectually eradicate any sourness in the cask.

After it has been filled with the liquor, the next process is the fermentation, and this is a matter of some nicety.

There are three fermentations; the vinous, the acid, and the putrid. When the first ceases the second begins, and when that ceases the third begins. The first is only necessary for cider, and care must be taken to stop all further fermentation, as soon as this is over. This is known by the liquor ceasing to throw up little bubbles to the top. Then too all the pumace is raised up, and, if suffered to remain there, will again sink to the bottom and render the liquor turbid. Let this time then be carefully observed, and let the liquor then be drawn off, not too closely, and put into other clean casks, or bottled, closed tight, and set away in a cool cellar. Let a gallon of French brandy be added to every barrel.

But, to further improve it, let it undergo a further operation, as follows: As you draw off the cider from the first casks, put it into fresh ones, filling each about three-quarters full, and set them away till Winter; at which time let them be exposed to the frosts, until one-half or even two-thirds of the contents of each are frozen; give the liqour some vent while freezing; draw off the unfrozen part, bottle it, or put it in clean new casks, and set it away in a cool cellar, and let it remain there for two or three years, and it will then nearly equal the best wines.

See further, WINE.

If it should require clarifying, let it be done with isinglass, or it may be leached through a tub of powdered charcoal, which will render it very clear; but the tub should be covered close to prevent any evaporation of the spirit. To clarify it with isinglass, pour into each vessel about a pint of the infusion, of about sixty grains of the most transparent of this glue in a little white wine and rain or river water, stired well together, after being strained through a linen cloth. This viscous substance spreads over the surface of the liquor, and carries all the dregs with it to the bottom.

Some boil cider in the Spring, for Summer-use; but the practice is a very bad one, particularly when boiled in brass kettles. If any boiling be ever proper for cider, it must be as it comes from the press. This is the proper method of treating water-cider, or that which is extracted from the pumace after the cheese has been pressed. The pumace is put into casks in the evening, with a due proportion of warm water thrown on it, and in the morning it is made into a cheese, and pressed off again; the liquor is then to be boiled till all the scum has risen and been skimed off, and then it is to be put away in casks in a cool cellar, and treated like other cider. It ferments but little, and makes a pleasant drink for the next Summer, if bottled, or otherwise kept well. Perhaps this would be a good method of treating all cider.

Cider may be kept for years in casks, without fermenting, by burying them deeply under ground, or immersing them in spring water; and when taken up the cider will be very fine.

A drink, called cider-royal, is made of the best runing of the cheese, well clarified, with six or eight gallons of French brandy, or good cider brandy, added to a barrel: Let the vessel be filled full, bunged tight, and set in a cool cellar, and in the course of a twelvemonth it will be a fine drink. If good rectified whiskey be used, instead of brandy, it will answer very well.

A quart of honey, or molasses, and a quart of brandy, or other spirits, added to a barrel of cider, will improve the liquor very much, and will restore that which has become too flat and insipid. To prevent its becoming pricked, or to cure it when it is so, put a little pearl-ashes, or other mild alkali, into the cask. A lump of chalk broken in pieces, and thrown in, is also good. Salt of tartar, when the cider is about to be used, is also recommended.

To refine cider, and give it a fine amber-color, the following method is much approved of. Take the whites of six eggs, with a handful of fine beach sand, washed clean; stir them well together; then boil a quart of molasses down to a candy, and cool it by pouring in cider, and put this, together with the eggs and sand, into a barrel of cider, and mix the whole well together. When thus managed, it will keep for many years. Molasses alone will also refine cider, and give it a higher color; but, to prevent the molasses making it prick, let an equal quantity of brandy be added to it. Skim-milk, with some lime slacked in it, and mixed with it, or with the white of eggs with the shells broken in, is also good for clarifying all liquors, when well mixed with them. A piece of fresh bloody meat, put into the cask, will also refine the liquor and serve for it to feed on.

To prevent the fermentation of cider, let the cask be first strongly fumigated with burnt sulphur; then put in some of the cider, burn more sulphur in the cask, stop it tight, and shake the whole up together; fill the cask, bung it tight, and put it away in a cool cellar.

To bring on a fermentation, take three pints of yeast for a hogshead, add as much jalup as will lie on a sixpence, mix them with some of the cider, beat the mass up till it is frothy, then pour it into the cask, and stir it up well. Keep the vessel full, and the bung open, for the froth and foul stuff to work out. In about fifteen days, the froth will be clean and white; then, to stop the fermentation, rack the cider off into a clean vessel, add two gallons of brandy, or well-rectified whiskey, to it, and bung it up. Let the cask be full, and keep the venthole open for a day or two. By this process, cider that is poor, and ill-tasted, may be wonderfully improved. Let it be refined by some of the methods before described.

To cure oily cider, take one ounce of salt of tartar, and two and a half of sweet spirit of nitre, in a gallon of milk, for a hogshead. To cure ropy cider, take six pounds of powdered allum, and stir it into a hogshead; then rack it off and clarify it.

To color cider, take a quarter of a pound of sugar, burnt black, and dissolved in half a pint of hot water, for a hogshead; add a quarter of an ounce of allum, to set the color.

Cider-brandy mixed with an equal quantity of honey, or clarified sugar, is much recommended by some for improving common cider; so that, when refined, it may be made as strong, and as pleasant, as the most of wines.

Cider has been made in Greatbritain, of such superior quality as to command a price of sixty guineas a hogshead.

If such can be made there, it can also be made here, where our climate in general is more favorable for the production of apples of the best qualities.

Mr. *Wynkoop* (of Pa.) says that the Virginia crabapple is the best for making cider within his knowledge.

See CRABAPPLE.

We will also add his method of managing the cider from that apple.

He says that when, by placing the ear at the bung, a hissing noise is no longer heard, then the fermentation has ceased; and then the cider should be drawn off. If this be not done, the pumace at the bottom will, during a damp or warm state of the weather, rise up, which produces a second fermentation, of the acetous kind, which hurts the liqour.

When the cider is drawn off into other clean casks, an ebullition pervades the liquor; and while that continues the bung is laid loose in the hole, and the gimblethole is kept open till the ebullition subsides. Then put in the bung tight, leaving the gimblethole partly open a little longer, and then close that up.

He fines his cider after the ebullition, which takes place after the second racking, has subsided. At this time, he draws off some gallons of cider into a small cask; to which he adds isinglass, pounded and unraveled into shreds, at the rate of two ounces for a hogshead; and the liquor thus drawn off, with the isinglass in it, is stired up for three or four days, so that it becomes diluted to a thin jelly; when the whole is strained through a fine hairseive, and put into a clean hogshead, which is filled with the rest of the cider from which a part was drawn, as before mentioned.

He racks off his cider six times; first, when the fermentation has ceased; second, when the ebullition has ceased; third, when drawn off to be put on the fining; fourth, when drawn off the lees of the fining; fifth, when the consequent ebullition has again ceased, and the cider has lain still six or eight days; when it is then drawn off into clean barrels, or bottles. He sells this cider for upwards of fourteeen dollars a barrel.

CLAY. The basis of this earth is alumine. A quality peculiar to clay is, that, by reason of its alumine, it contracts, when dried or heated, and expands again, when moistened. A clayey soil therefore is always to be known by its cracking open in dry weather; and the more clayey, the wider will be these openings.

Where the soil is very clayey, and at the same time wet, it is worth but little for the plough; though it may be good for mowing, or pasture; but if the adhesion of the soil be destroyed by proper manures, and it be laid dry by hollow-draining, it then becomes a fine soil for most productions.

See MANURES, and HOLLOW-DRAINS.

Some nicety is requisite, as to the proper time for ploughing this ground. If it be too dry, it will not crumble; and if too wet, the ploughing will only render it more compact. The hard clods are easiest mellowed by the plough, after they have been merely wet through with a gentle rain.

See further, EARTHS.

CLEARING OF LANDS. But little need be said on this subject; as he who has to undertake the clearing new lands will acquire more knowledge, from practice, of the best methods of subduing our heavy forests, than from any essay on the subject. He will find that the essential point is to put his shoulder to the wheel, and persevere undauntedly; and in a few years he will find his exertions amply compensated, by the pleasing scenes and profitable improvements which shall have been made around his dwelling.

When new Settlers first go into the woods, they have to spend much valuable time in hunting up their Oxen and Milchcows, which, for want of an enclosed pasture, have to run in the woods; and to remedy this, as soon as possible, we would propose the following: About the first of June, take a suitable piece of ground, cut out the bushes, and all the small growth of timber which shall be under a certain size, say a foot over at the but; pile all the brush round those trees which are left standing. In a dry time, in the month of August, set fire to them, and the fires will kill the trees left standing; then pile and burn what lies on the ground, which is soon done, and in due season harrow in a crop of wheat or rye, and in the following Spring sow the ground over with herdsgrass. The crop of wheat or rye, sown in this way, will be nearly as good as if the timber were all taken off; and the year following the ground will afford the requisite supply of pasture and hay. When the limbs of the standing trees begin to rot and fall off, cut the whole down, and let them lie there; as the pasture will not be injured, but rather eventually benefited, by the trees lying and roting upon it. This method of killing trees by fire is, however, only recommended where they are such as cannot be killed by girdling; such as beach, maple, basswood, &c.

New Settlers, who will take this method of providing a supply of pasture and hay, will always find their account in two ways: It is turning the grounds to immediate profit, with the least possible expense; and the surplus of hay and pasture will command an extra price; as those articles are always scarce, during the commencement of new settlements.

CLIMATE. All seeds are to be planted, or sown, at such time as is suitable to the climate. In northerly climates, or in very elevated situations, the Spring and Autumn press closer upon each other; and there the Spring-crops must be planted, or sown, later, and the Fall-crops earlier, than in more temperate climates. The right time for planting and sowing must, therefore, be ascertained by the judgment of the Farmer, founded on due experience, and a knowledge of the climate in which he lives.

Climate depends greatly on *altitude* as well as *latitude*. This is no where more strikingly exemplified, than on the sides of Mount Ætna. When, at the base of that mountain, the Peasants are reaping their Spring-crops, on its highest cultivable parts they are busied in sowing the same crops; and at its extreme point of elevation is perpetual Winter. The highest lands which lie between the Mohawk and Blackriver, in this State, are not fifty miles north of Albany; yet the climate, on this height, is at least six degrees of latitude colder, than at that city.

From a knowledge of these facts, it is obvious, that the same productions will not thrive equally well in all places, under the same degree of latitude, even though the soil be the same; and, knowing this, it becomes necessary for the Farmer to regulate his system of farming accordingly.

CLOVER *(Trifolium pratense.)* White-clover is a very fine grass, affording the sweetest pasture and hay; but the product is too small, when compared with red-clover, which is nearly as sweet, to be worth cultivating.

The almost universal use of red-clover, upon dry upland soils, is, it would seem, an indication of its superiority over most other grasses; but, it certainly never can be made to yield so great a clear-profit as Lucerne, where this grass is cultivated in a suitable soil and climate.

See also GRASSES, for the great product of the Fioria.

One excelence of red-clover is, that it is the only grass which can with advantage be turned under by the plough, and thus, with one ploughing only, ensure a good crop of wheat or other grain. The crop, however, will be best where the clover is mowed, and not fed off by cattle. Another good quality is its superiority over almost all other grasses, in mellowing and enriching the soil. It derives most of its nourishment from a considerable depth; and, like all tap-rooted plants, it exhausts the land but little; while, at the same time, when ploughed under, it forms a good green-dressing for the soil.

Green clover is a good food for Swine, during Summer; and clover-hay, when boiled, is also found to be a good food for them, during Winter. Mr. *Livingston* makes mention of a Farmer at Rhinebeck, who fed his Hogs, during Winter, with no other food but boiled clover, and that they were kept in good condition. The clover used for them was preserved by being salted, a half peck to a load. It was cut and left in winrows about six hours, then put into small cocks. The next day, about noon, these were opened; towards evening they were hauled home, and laid away with salt, which kept the hay green all the year.

See further, SWINE, and STEAMBOILER.

The quantity of red-cloverseed, to be sown to the acre, is about fourteen pounds, and none but clean seed ought to be sown.

The best crops with which to sow clover, are barley, oats, and Spring-wheat. It is, however, frequently sown in the Spring, on Winter-wheat, or rye; but in this way it often happens that the seeds do not grow, owing to their not being covered. This difficulty may, however, be obviated, by giving the ground a brushing, by draging a large bunch of bushes, tied together, over it, where the land is rough; or by giving it a light harrowing, where it is smooth; either of which methods, but particularly the latter, will be a benefit to the growth of wheat or rye. It may also be sown with Winter-wheat, or rye, in the Fall; but there is danger in that case of its being killed by the succeeding Winter.

Clover yields two crops in the season, if the land be in good heart; unless it be in the northerly parts of the State, where the second growth will generally be too small to mow to advantage, and is, therefore, best to be fed off.

When a crop of red-cloverseed is to be raised, let it be from the last crop of the second year; as suffering the crop to ripen injures the roots for a succeeding crop. In the first crop, of either season, very little seed is to be found. In more northerly climates, where a second crop is scarcely to be afforded, let the clover be pastured the second year, until about the tenth of June; and then let it grow up for the seed-crop, which is to stand till the seeds are fully ripe.

As this growth, when it has stood so long, is of but little value for hay, we believe the best plan is merely to cut off, with the sickle, so much of the crop as to gather all the heads; and then to turn the rest under with the plough, as a green-dressing for the soil.

See GREEN-DRESSING.

By this management the land will be essentially improved for bearing the next crop, and the expense of threshing out the seed will be greatly diminished, on account of its being contained in a much less quantity of the crop, than where it is mowed off with the sithe.

The part containing the seed must be well dried in the sun, before the seed can readily be threshed out, which operation may be performed with Horses. About three bushels of seed may be expected from an acre; and it usually sells for about eleven dollars per bushel.

If it be desirable to keep land constantly in red-clover, it may be done by sowing about half the usual allowance of seed every Spring on the ground, and giving it a harrowing; which will assist the growth of the plants of clover already in the soil, and serve to cover the seeds.

For producing the greatest crops of clover, it is advisable to give the ground a slight dressing with gypsum, after each mowing. Half a bushel of this manure may be strewed equally over an acre, by its being well mixed with a suitable proportion of dry earth, or ashes and fine salt; the two latter ingredients being useful to the soil, as an additional manure.

Under NUTRIMENT OF FOOD, it will be seen, that red-clover is among the most nourishing grasses; though perhaps not so much so as some others. The hay made from it is, however, found to produce too great a degree of looseness, when fed to Horses, and on this account should have a mixture of timothy or other suitable grass grown with it, when it is intended for hay for these animals.

See further, GRASSES.

COMPOSTS. *See* MANURES.

CORNSHELLER. A machine for shelling Indian Corn. It was invented in Massachusetts, and patented by the Inventor. The expense of the machine is about twenty dollars. It separates the grain perfectly clean from the cob, at the rate of about half a bushel in a minute. One Hand is requisite to turn the roller, and another to throw in the ears. The work proceeds as fast as the ears can be thrown in singly, or one at a time.

Those who raise large crops of this grain will find a great saving in the use of this machine. It is not subject to get out of repair; and, with care, would probably last a century. A number of Farmers or Planters may, very readily, have one of these machines in common stock. The model of it may be seen at the City of Washington.

COTTON *(Gossypium.)* There are different species of cotton-plants; but all natives of warmer climates. 1. The common herbaceous cotton, that creeps along the ground, has yellow flowers, succeeded by large oval pods, filled with seeds and cotton. 2. The American cotton, with hairy stalks, two or three feet high. 3. The Barbadoes cotton, with a shrubby branching stalk, four or five feet high. 4. The tree cotton, with a branching woody stalk, six or eight feet high. The flowers and pods of the three latter species are like those of the first. The three first species are annual, and the fourth perennial.

The cotton-plant cultivated in the Southern States is annually planted in April, or earlier. The ground is prepared, and the seed commited to the earth, in a manner very similar to that pursued in the culture of Indian corn. The young plants come up with two yawning lobes, similar to the cotyledons of the common bean; and when they appear above ground the weakest are pulled up, and none left but those which are strong and vigorous. The weeds are eradicated from the growing plants in the usual manner of hoed crops, and the crop is collected in October and November.

About double the number of Hands are requisite to gather the crop, that were necessary in raising it; but, in this harvest, Children are capable of performing a considerable share of the business. The wool is cleared of the seeds by the gin, and is afterwards hand-picked, in order to clean it thoroughly from any particles of the pods or other substances adhering to it. It is then stowed in large bags, where it is well trodden down as it is thrown in; and, in order to assist in pressing it more compactly, some water is every now and then sprinkled on the outside of the bag.

In this Country, cotton of the best quality is produced in the immediate vicinity of the ocean: The seaisland cotton is therefore the most valuable. The fertility of the soil for raising the crop does not seem so essential. Dr. *Mease* says he has 'seen it grow and flourish with equal luxuriance in the black alluvial soil of an island in the Altamaha, and in the blowing sand of St. Simons.'

As the crop does not very essentially exhaust the soil, it would seem that level lands may, for a considerable length of time, be kept in the culture of this plant; but where the lands lie rolling or undulated, and are at the same time of a retentive nature, the heavy showers, which commonly prevail in the southerly latitudes, are calculated greatly to injure grounds under the constant cultivation of this, or any other hoed crop, by washing away the best parts of the surface, and by cuting it into deep gullies; which are equally injurious to good cultivation, and unpleasant to the eye of those unaccustomed to view such lacuations of our mother earth, but to behold her in her native robe of green.

Whether the product of cotton can be essentially augmented, by the application of common manures, we are not particularly informed; though we have understood, that common salt assists the growth of the crop, when applied to the plants. If this be the case, the method of sending sea-water into the interior, as described under MANURES, might probably be found advantageous to the crop.

In regard to the insect that is often so injurious to cotton, we can only say, that if it arrive at the part of the plants where it commits its depredations, by climbing up the stalks, its ascent might probably be prevented by surrounding each stalk with some repulsive ointment, or matter, as mentioned under INSECTS; but, how well this additional labor would be rewarded, by the saving in the crop, experience alone must determine.

Let the insect arrive at its place of destination in whatever way it may, a method of extirpating it is mentioned in the Edinburg Encyclopedia, which the Writer thinks might be pursued to advantage: This is to prepare something similar to an umbrella, the covering being merely of paper, which is to be set over the plants, successively, while a match of burning sulphur is placed underneath. The cover confines the fumes of the sulphur, so that the insects are enveloped in it; in which situation the Writer thinks they must perish in a very few minutes; so that one Man, with these means of destruction to the insects, could fumigate a great many plants in a day.

The Writer makes a calculation how much ground could, in this way, be gone over, by one Hand, in a day; the result of which is, that the expense of the process would not be very considerable. The plan may be well worthy of experiment.

We imagine that Planters in general will see the propriety of relinquishing, in a great measure, the growing of cotton, for other pursuits of agriculture, more profitable, and less calculated to exhaust the soil. Even if cotton be not so great a scourger of the land as many other crops, still it affords no essential return of manure to the earth; and lands, even if not wholly exhausted, will become *tired* of bearing too much of one particular growth.

There is a general disposition in almost every part of the earth to require changes in the growths which it bears. We see this exemplified even in the forests. Where land becomes divested of its timber, by clearing or otherwise, and is afterwards left untiled, it usually produces a new and different growth from that which it formerly bore.

The extensive culture of the Guinea-grass (*See* Grasses) will enable the Southern Planters to cover their fields with cattle; and where these may be readily grown, in profusion, there will always be found the residence of wealth and plenty.

COWS. The marks of a good Cow are these: The forehead broad, the eyes black, the horns large and clean, the neck long and straight, the belly large and deep, the thighs thick, the legs round with short joints, and the feet broad and thick. Red Cows are said to give the best milk; though the black ones are said to bring the best Calves, which is, however, doubtful. But the Cow that gives milk the longest time, between the periods of her calving, is generally best for profit or for family-use; provided, the quantity and quality of her milk be equal to that of others. Just before calving, a Cow should be well fed; and, if she calve in Winter, her drink should be a little warmed for a day and night afterwards. If she does not clean well, after calving, give her a pale of warm water, with some ashes in it. Those that calve pretty early will yield most milk in the season.

The times of milking ought to be regular, and as nearly equi-distant as possible. Where the feeding is full, it is found that milking three times a day, during the Summer season particularly, will increase the quantity nearly one-third. In that case, the first milking ought to be by sunrise, the second about one, and the latter about seven or eight o'clock in the evening. Omiting to milk Cows regularly, at least twice a day, tends very much to dry them. Sometimes one or more teats of a Cow may be diseased; but this does not affect the milk of the rest.

Cows are certainly very profitable. Allowing one to give only six quarts a day, for forty weeks in each year, and this is not a large allowance, her milk, at two cents per quart, will amount to upwards of thirty-three dollars; which is probably sufficient to purchase her, and pay for a year's keeping.

See further, Neat-cattle, Cream, Dairy, &c.

CRABAPPLETREE (*Pyrus Coronaria.*) The tree bearing this name in Europe is different from that found in this Country. The blossom of that growing here is very fragrant; its fruit small and sour. The Virginia crabapple is famous for the cider made from it; but we believe it must be a variety of the tree different from that growing farther to the north, as the fruit of this has an uncommon degree of *acidity*.

The Virginia crab is an alternate bearer. An orchard of two hundred and forty trees of this kind is cultivated, in Pennsylvania, by Mr. *Wynkoop*. The trees are about twenty years old, and they afford him, every other year, about one hundred and sixty barrels of cider, which, after being made, and fined, after his superior method, he sells for about thirteen dollars a barrel, exclusive of the cask. Cider made from the Virginia crab has been taken for champaine.

The tree is hardy, suited to almost all soils, uniform in its bearing, and the limbs are less liable to split or break off, when heavily laden with fruit. Probably it might be made a yearly bearer by being treated, at the commencement of its bearing, in the manner directed under APPLETREE. If so, it would greatly enhance its value.

For the process pursued by Mr. *Wynkoop*, in maturing his cider, *see* CIDER.

CREAM. Pans, or trays, for holding milk, to raise the most cream, ought to be broad and shallow, and the milk put in them should not be more than three or four inches in depth. Tin and wood are the best materials for making these. Some line wooden trays with lead; but this is a bad practice, as lead may sometimes be dissolved by the acid of the milk, and then it is poisonous. Wooden trays ought to be well scalded, and dried in a cool place, as often as new milk is put into them, to prevent the wood from absorbing too much of the acidity of the milk, and thus coagulating the new milk, before the cream has time to rise; for cream will not rise, after the milk has become coagulated.

If new milk be kept as warm as when it comes from the Cow, no cream will rise on it; but, when sufficiently cooled, the cream separates from the rest and rises to the top. In order then to effect this, to the best advantage, the new milk should be made as cool as possible, and the cooler it is thus made, the more suddenly and effectually the cream will rise. The cooler the cellars, therefore, in which milk is kept, the better. To set milkpans, made of tin, in beds of salt, would, no doubt, be useful, where the cellar is too warm; and to set all milkvessels on a floor which is constantly covered with cold springwater, is also an excelent plan; and, where it can be done, ought never to be omited.

Most of the cream comes last from the Cow in milking. The last half-pint of milk that can be got, by milking the Cow dry, contains as much cream as the first quart, or perhaps three pints; aud, for this reason, Cows ought always to be milked as clean as possible. The quantity of cream will also be greater, if the milk of each Cow be strained into a pan by itself, as soon as possible. The practice of pouring the milk of the Cows together, while milking, and leting the whole stand till nearly cooled, is a very bad one, as, in this way, much of the cream will not afterwards rise.

It is said, that any given quantity of milk, having the cream separated by the scalding process we shall describe, yields a fourth more of butter; and it is well known that this cream may be churned into butter in two or three minutes.

The milk is kept twenty-four hours; it is then put into a vessel over a small fire, which shall only be sufficient to raise the heat of the milk, nearly to boiling, in two hours, not less; and when it has been this length of time heating, and begins to exhibit indications of being near boiling, by bubbles rising to the surface, it is to be taken off, and let stand twenty-four hours more. The smallest degree of boiling mars the process.

At the end of this time, the cream will be all on the surface. It is then to be divided into squares, with a knife, and taken off from the milk beneath. This cream will keep much longer, without souring, than cream raised in the common way; and may be, at any time, quickly converted into butter. It may also be salted, and used on bread, or otherwise, without churning.

It is good for coffee, but not for tea; as, when put into this liquid, a part of it turns immediately into butter. In London, this cream is considered a great dainty, and, in Winter, is sent into that city from a distance of two hundred miles.

CUCUMBER (*Cumcumis.*) This is a cold fruit and hard of digestion; yet pleasant to the taste. They are rendered more wholesome by pickling; though the taste of a pickled cucumber must be considered far inferior to those which are fresh, when properly prepared for eating. This is best done by slicing them, and then puting them in cold water for a while, which renders them more easy to digest.

Mr. *Cowper*, in his '*Task*,' in describing the method of raising cucumbers in hot-beds, directs that after 'two rough indented leaves' are produced, 'a *pimple* that portends a future sprout,' on 'the *second* stalk' is to be pinched off, to prevent its growth; and this, he says, will make the other branches grow more strong, and be more prolific.

The soil for cucumbers cannot be too rich, nor too well cultivated, to raise a great crop. A spot well manured with fish, or other flesh, will produce a great quantity. Hogs-dung is also very good for them.

See also Radish, for a good manure for them.

Take a tub and fill it half-full of stones, and with as much water; over this lay some straw, and fill the tub with the richest earth; plant this full of the seeds, and guard the plants well while they are subject to insects, though they will be much less subject to them in this way; spread some brush round the tub for the vines to run on, and in this way a great crop may be raised. The water in the tub must be constantly replenished by a tube from the outside, which will keep the soil in the tub sufficiently moist.

See Insects, for the method of keeping them off the young plants.

CURRANT *(Ribes.)* There are a variety of currants, including those called gooseberries. (*See* Gooseberry.) The black currant, which grows in the swamps in this Country, is greatly improved by cultivation, says Mr. *Winterbotham*, and affords a wine equal to Port, when it has age. It is also an excelent medicine for a sore mouth and throat. When bruised and steeped in whiskey, or other spirits, it is also excelent for colds and for bad coughs arising from pulmonic complaints. They are to be steeped a fortnight or more; then strain the liquor, bottle it, and put it away for use. The red and the white currants are most common here, and each makes good wine, though the white is thought to make the best. Currants are the most useful of all the small kinds of fruit-trees, and for making wines they are very profitable.

After pressing out the juice for making wine, let the seeds be dried, and sown late in the Fall, or early in the Spring, on fine light earth, and from these, new varieties may be had; some of which may be found very fine, and much superior perhaps to those in common use. Some may be found to ripen early, others late, which are qualities particularly desirable for family-uses.

Currants are easily propagated from cutings, which is the usual method, or from layers or slips.

See Layers and Slips.

As soon as vegetation has commenced, take the strongest and straightest shoots, but not such as are suckers, and set the ends pretty well in the ground, in order that they may have sufficient moisture; and let them be watered, if the weather be very dry, after planting. They will soon take root, and the next season will begin to bear. They should then be kept carefully pruned, and should not be suffered to run too high. They should be kept clear of suckers, as these draw much of that nourishment which is requisite for the fruit. The ground about them should be occasionally hoed, to keep it clear of weeds and grass.

Currants will do very well even on light sandy soils; but, perhaps, the best soil for them is a good mellow sandy loam. With proper culture, however, they will grow pretty well on almost any soil that is not too hard and poor.

Mr. *Forsyth* gives some very minute directions for pruning currants, and applying his composition to the wounded parts; but in this instance, as in some others, he probably carries his theories to extremes. Whatever may be the case in Greatbritain, where fruit is not so easily raised, it is believed that the above general directions, if pursued, will ensure good crops of currants in this Country, which appears to be very natural to their growth.

To make Currant-wine. Take currants fully ripe, at the rate of one gallon for each gallon of water; bruise them fine in the water; strain the whole through a cloth, and add two pounds and three-quarters of good brown sugar to every gallon of currants and water thus mixed together; stir it well, and, when the sugar has dissolved, put the whole into a clean cask, filling it full, and leaving a good vent-hole open. When the fermentation is over, stop it up tight, and in six months it will be fit for bottling or for use. Like other wines, however, it improves much by age.

Probably molasses, well clarified, might be made to answer instead of sugar; and, probably, honey, or a due mixture of it, would be better than either.

An acre planted with currants, and well cultivated, would probably yield, on an average, a quantity of fruit sufficient to make a thousand gallons of wine yearly. The expense of making this wine does not exceed fifty cents a gallon; and the wine, after having a little age, is worth treble this money.

A currant-garden should be set with the bushes in rows, about eight feet between each, and about three feet between each bush, with intervals of proper width and at regular distances for passing across the rows. Planting currants on the south side of a wall will make them ripen more early, and they will ripen later when planted on the north side.

CUTINGS. These are twigs of trees cut off and set into the ground, where they will take root and grow. They should be taken from young thrifty trees.

Cutings of currants, grapevines, willow, Lombardy poplars, &c. are made to grow without any difficulty; those of quinces are not so easy, and those of the appletree are still less so. Let those which are most difficult to grow be set as deep as twelve inches; those less difficult six, eight, or ten, as the kinds may require. Let them be cut and set in the Spring, as soon as vegetation has commenced; and perhaps earlier than this is best for those which are most difficult to grow. Let them be frequently watered, when the ground is dry. The twigs used for this purpose should be of good straight growth; but not such as are suckers, as is said by some.

Appletrees raised in this way will not grow so large as those raised from the seeds; nor will they be so long-lived; but in this way, as in grafting, the choicest selections of fruit can be made.

Where cutings are to be kept some time, before seting in the ground, let the cut ends be kept in moist earth, and soaked in water before they are set.

See further, Slips and Scions.

It has always been said, that neither cutings, slips, or scions should be taken from the sprouts of trees. *Forsyth* particularly insists on this, alleging that sprouts never become good bearers. Sprouts certainly bear no fruit, while they are mere thrifty upright shoots; but it is believed, that when they have obtained considerable size, and shoot out their lateral branches, these will become as good bearers as any other branches of the tree. For currants, in particular, some who have tried cutings of the sprouts, for seting, assure us that they prefer them to the branches; as they grow straight and thrifty, and, when they have thrown out their lateral branches, bear exceedingly well.

It has been said, that a cuting, slip, or scion, when planted, or grafted, will live no longer than the parent stock, if that die a natural death. Mention is made, in the letters of *Espreilla*, of a very famous peartree at Teignton, in Greatbritain, which, on account of the excelence of its fruit for making *perry*, was called the *Teignton Squash*; that all the neighboring Farmers grafted from this tree; and, that when it was found in the last stage of decay, all the grafts which had been taken from it were found in the same condition.

Perhaps it will be found, that cutings, slips, or scions, will die, when the parent stock dies of natural decay; but that the same rule will not hold in regard to suckers, as these appear to be somewhat of a different kind of growth, and more in the nature of a young tree. They seem to grow with more health and vigor, than the lateral branches.

D.

DAIRY. The business of the dairy requires close attention. The milkings, in order to be most profitable, should be three times a day; the first at daylight; the second at noon; and, the latter at twilight. This will very considerably increase the quantity of milk given in a day from any number of Cows.

In order to ascertain which Cow's milk is the best, as yielding the most cream, let the milk of each be put by itself, and their products of butter will then determine the point. The quantity of milk afforded by each should also be taken into consideration.

See further, BUTTER, CHEESE, CHURN, COWS, CREAM, NEAT-CATTLE.

Dr. *Anderson* recommends wooden vessels, as being the most wholesome for holding milk; but that, if tin pans be used, they should be washed, every time they are emptied, with warm water in which a little salt has been dissolved, and should be kept clean by scouring; and, to prevent acidity in wooden vessels, they should in like manner be scoured and cleansed with hot water. Leaden vessels he condemns, as is mentioned under BUTTER.

The dairy requires two appartments; a clean cool room in the cellar for the milk, and a dark room above ground for drying and keeping the cheese. Many Farmers, however, confine their attention to making butter alone; and in that case a good cool cellar is the essential requisite. Let the milk be set on the ground; for it is the coolest part of the cellar in Summer, and the warmest in Winter.

If milk be kept in tin pans, and set within earthen ones, of a texture so porous, that the water in them will gradually exude, it will impart a great degree of coolness to the milk. The water in the earthen pans should surround those holding the milk. If the outer pan were made of stiff leather, it would answer the same purpose.

DEW. 'An experiment (says Mr. *Livingston*) has been made to ascertain the difference between dew-water and rain-water, by puting an equal quantity of each in different vessels, and seting them in the sun to dry away: The result was, that the sediment or settlings of the dew-water were greater in quantity, blacker, and richer, than those of the rain-water.'

Dew is, therefore, fertilizing; and this is the reason why lands will be most benefited, by being constantly ploughed when the dew is on them.

See FALLOWING, &c.

DITCH. This is either for enclosing grounds, to serve in the place of other fencing, or to carry off superfluous water. When made for a fence, it ought to be four feet wide at the top, one, or less, at the bottom, and about two and a half deep; with the earth all thrown out on one side, and banked up as high as possible. This, however, is but a poor fence, unless a hedge of some kind be planted on it; or, unless it be raised higher by posts and rails, or boards; or, by stakes and wickerwork; and this, where cedar can be had for the purpose, makes a good durable fence.

See HEDGES.

To drain swamps, ditches ought to be of size and depth proportionate to the extent of the swamp; or rather let them be proportionate to the quantity of water to be carried off. Those round the edges of the swamp ought to be so placed, as to receive all the water from the springs which commonly run in on every side; or, if convenient, they should be so placed as to cut off the springs, by receiving them into the ditch. When a very wet swamp is to be drained, the months of August and September are the best for performing this labor, as the ground is then driest; while, at the same time, the water will not prove troublesome by its coldness. The proper proportions for these kinds of ditches are, to be three times as wide at the top as they are at the bottom, and a little more than half as deep as they are wide. If they are not thus sloped they will fall in; owing to the heaving of the ground by the frosts. To prevent their falling in, it is advisable to sow some strong-rooted grass on the sides of the ditches.

See further, BOG-MEADOW.

DIVISIONS OF A FARM. If a farm be nearly square, it may sometimes be advisable to have a wide lane through the middle, and lots laid off on each side; or, if it be more oblong, a wide lane on one side may be advisable, and the lots laid off to it. No certain directions can, however, be given on this head, owing to the different shapes, soils, &c. of farms. A lane of this kind may often be the more eligible where it can take in some spring, or other living water; as, in that case, every field becomes accessible to the water at all times, by leaving open the gate of that which is in present use in pasturing.

Lots for tillage should always be square, or at least of equal sides; those for mowing or pasture may be irregular, without any inconvenience.

DRESSING. A dressing differs from a manuring only in this, that the former is intended merely for one crop, while the latter is intended for several. Some dressings, such as gypsum, ashes, salt, &c. are to be laid on the soil; others again, such as composts, &c. are to be slightly buried in it, and mixed with its surface.

DRILL. A machine for sowing seeds, by opening one or more furrows, at proper distances from each other, of a depth suitable to the seed to be sown, and at the same time droping the seeds, and covering them, all at one operation. It is to be drawn by one or more Horses, according to its size; or it may be drawn by hand, or pushed forward, something similar to the manner of pushing a wheelbarrow, where a small machine for drilling a row at a time is to be used.

Of this latter description may be those for drilling in the seeds of Indian corn, beans, turnips, onions, and generally all seeds which may be cultivated in rows, or drills, to advantage, and which have seeds of such shape as can be properly droped at suitable distances with this implement of husbandry.

Where wheat, or other grain, that is usually sown in the broadcast, is to be drilled, the implement for the purpose is to be of such dimensions as that several rows are drilled in at once. Mr. *Rutherford* makes mention of one used in Newjersey, for drilling in wheat in rows, at the distance of about thirteen inches between each, which is drawn by two Horses, and with which about eight acres may be drilled in a day.

The cost of this drill he states to be about ten dollars; and he adds, that, where the seed is drilled in with this machine, less seed is requisite, and a larger crop is to be expected.

It is certain, that as much as one-third of the seed may be saved by drilling in wheat, and some other grains, which are usually sown in the broadcast; but we are not so confident, that an increase of crop, to any essential amount, is to be expected from this method of commiting wheat to the earth; as we do not find this insisted on by the agricultural Writers in Greatbritain, where the drilling-husbandry is well understood.

Still, however, the effects of drilling in wheat may be found more advantageous here, than in that Country; and, at all events, the mere saving of seed will amply repay the small additional expense incured by the use of this machine for covering wheat, barley, and some other grains.

But the excelence of drills is principally to be found, in the facility with which seeds can be buried which are only proper to be planted or sown in rows, or in hills; as, in such cases, one Man with a drill, to be drawn either by hand, or by a Horse, as the case may require, will perform as much, in commiting seeds to the earth, as would be done by six, eight, or ten Men, in the same length of time, without the use of this implement; and, at the same time, the work done with the drill will be found much better executed, and with a great saving of seed.

Drills, however, are only proper for grounds which are clear of stones, and other impediments to the use of these machines.

For descriptions and drawings of the different kinds, in use in Greatbritain, we refer the Reader to the Encyclopedias lately published in that Country, or to Editions of either of them published here.

DROUGHT. As a country becomes cleared of its timber, it becomes more liable to droughts; and these will be more or less severe according to the climate. That which is naturally cool and moist, such as that of Greatbritain and Ireland, will seldom, if ever, be affected by too much dry weather; while that in which the Summers are hoter, and of course the atmosphere dryer, will often suffer much on this account. In most parts of Spain, the fields are parched up by the middle of Summer; but before this the crops are all harvested. In this Country, droughts are never so severe, nor so universal; yet partial ones are often experienced, much earlier, and long before the crops have come to maturity. This is an evil; and all the Farmer can do, is to make the best possible provision against it.

Generally speaking, nothing is better calculated to ward off the effects of droughts, than good cultivation, by ploughing sufficiently deep, and effectually, and manuring well. Ground that is well mellowed, to a proper depth, will stand a drought much better, than that which is ploughed shallow and left in clods; and that which is well manured will retain more moisture than that which is poor. Again, ground which is thus well prepared, and manured, shoots forth its crop so rapidly, that the ground is soon covered and shaded from the heat of the sun; and, for this reason, retains its moisture longer. The same may be observed of mowing-lands.

Gypsum is also an antidote to droughts; and, fortunately, it suits the soils best which are most affected in this way.

Another way to avoid the effects of droughts is, to cultivate swamp-lands more extensively, in raising such productions as are most liable to receive injury in this way. Such lands, when well drained, and duly mixed with proper earths, or other manures, may undoubtedly be rendered excelent for almost every Summer-crop which is liable to be injured by too much dry weather. Wet lands also, which have been hollow-drained, will stand a drought much better than in their original wet state.

See HOLLOW-DRAINS.

In pastures, planting some kinds of trees, in different parts, is beneficial in preventing the effects of drought; and the best for this is the locust; as it will increase the pasture, serve for shade, and eventually yield much valuable timber and fuel.

See LOCUST.

DUNG, DUNGHILLS, &c. *See* MANURES.

DYING OF CLOTHS, &c. As the Domestic Manufacture of cloths, and particularly of woolen, is important to the welfare and Independence of the Farmers and Planters of our Country, we have thought proper to devote a page or two of this Work, in directions for dying some of those colors which are seldom or never out of fashion; such as the black, the grays, the blues, and the greens, of different shades, together with some easy methods of producing a variety of other colors.

The essential point, in coloring, is a knowledge of the means of *seting* the colors so permanently, that they will never fade. In cottons, this is often a matter of difficulty: In woolens it is less so. The liquid, or substance used to set colors, is called the *mordant.* The proper mordant for blues, and for scarlet, or red of various hues, is the *solution of tin*, and is prepared as follows:

Take two parts of spirit of nitre, one of fuming spirit of salt, and in this liquor dissolve one-twentieth part of its quantity of the purest tin that can be had, or more if the liquor will dissolve more. The tin is to be granulated, and put in by degrees, as the liquor dissolves it. To use this mordant, dilute it in two or three parts of clear stream-water, according to its strength, until it has the acidity of vinegar, or lemon-juice.

The mordant is to be used in two ways. Where it gives no color of itself, the cloth or yarn may be first put into the mordant a suitable length of time, and then put into the dye; or a suitable proportion of the mordant may be mixed with the dye: But, where the former gives a color of itself, the cloth or yarn should first be put into it, and then into the latter. Thus, for dying cotton black, the mordant commonly used is a boiled decoction of fustic, which of itself gives a yellow color; but, after having received this, will receive a permanent black dye. The bark of the quercitron will answer instead of fustic.

A good black for woolens is only to be obtained by first dying them a deep blue, fixing that color with its proper mordant; and then they are to be put in the black dye, with its mordant.

The different hues of gray are merely mixtures of white wool with suitable proportions of wool dyed black, in the manner just mentioned.

Green is a mixture of blue and yellow dyes; and may be a lighter green, by more of the yellow first given it, with its mordant, and afterwards less of the blue, with its mordant; or, *vice versa*, for a deeper green.

The same may be observed of other hues, which are produced by a mixture of two, or more, of the primitive colors. The deepness, or the lightness, of any particular primitive color, or of mixtures of either, is obtained by a proper apportionment of the dying ingredients, with their proper mordants; that is, where the color is intended to be deep, more of the ingredients are to be used; and less, where it is to be light.

After premising thus much, we will give a list of different colors produced by different vegetable substances, with the mordant proper for each, as far as we have been enabled to obtain a knowledge of the same:

Vegetables.	*Colors.*	*Mordants.*
Indigo,	Blue,	Solution of tin.
Woad,	Do.	Do.
False indigo (flowers)	Do.	Do.
Blue Whortleberry (fruit)	Mazarine blue,	
Pokeweed (fruit)	Tyrean purple,	
Wintergrape (fruit)	Violet,	
Common hazlenut husks (green)	Black,	Copperas.
Hickorynut husks (green)	Do.	Do.
Witch hazlenut husks (green)	Do.	Do.
Sumac (bark)	Do.	Do.
Oak-trees (bark)	Steel,	Do.
Maples (bark)	Purple,	Do.
Walnut-trees (bark)	Olive,	Do.
Sassafras (bark)	Red,	Do.
Madder (roots)	Do.	Do.
Persimmon-tree (bark)	Crimson,	Allum and salt of tartar.
Locust-tree (bark)	Yellow,	Do.
Poplar-tree (bark)	Do.	Do.
Peachtree & Arsesmart (leaves)	Do.	Do.
Stonefruit-trees (bark)	Nankeen and Cinnamon,	Do.

For dying the scarlet, three parts of water to one of solution of tin, are to be mixed together; and then such a quantity of cochineal must be added, as will just give the scarlet hue; and, if a still paler red is wanted, the quantity of cochineal and mordant must be reduced.

To give a dark and unchangable blue color to wool (says Mr. *Genet*, from whom we derive most of the information in this article) the French Manufacturers mix one part of the best indigo, pulverised, with eight parts of vitriolic acid, well concentrated, and leave it undisturbed for twenty-four hours. They then add, by degrees, ninety-six parts of pure soft water to the mixture, and stir it frequently.

If the wool, or cloth, when immersed in this, becomes of too dark a blue, its color is to be made lighter by its being soaked about a day, or a longer or shorter time, as may be found necessary, in a cold solution of twenty-four parts of pure soft water and one of sea or common salt.

Allum, says Mr. G. may be used as a mordant for indigo; and if any woolens are immerged in a bath containing a solution of soda, after being dyed with this blue, and fixed with this mordant, they will acquire a darker color. The same method, he says, may be successfully applied to silk, but not to linen or cotton.

E.

EARTHS. Chemists, by analysing the substance which forms this earth, find it to contain several distinct kinds of matter, which they denominate *primitive* earths; which are, however, unnecessary to be designated here, farther than as some of them enter into the composition of soils. These are principally *lime*, *magnesia*, *silex*, and *alumine*, In addition to these, other substances are found in soils; such as *animal* and *vegetable* matter, in a decomposing state, certain *saline* compounds, and the *oxoyde of iron*.

Lime is seldom found in its purity; but is generally combined with other earths, and with acids. What are commonly called limestone, marble, chalk, and the different kinds of marle, are all mixtures of lime with other earths, combined with carbonic acid, and are each called carbonates of lime.

Gypsum, or sulphate of lime, is a mixture of lime with other earths, combined with sulphuric acid; and, when lime is combined with phosphoric acid, it is called phosphate of lime.

Lime, in its pure state, is infusible; but is readily dissolved in acids, or in six hundred and eighty times its weight of water. When either of the above-mentioned acids is poured on any stone, or earth, which contains lime, an effervescence will take place, by which the presence of this earth may always be discovered.

Limestone, gypsum, marble, &c. are generally found the uppermost of the stony incrustations of this globe; and appear generally to have been formed, before the dry lands appeared. Chemists suppose them to be principally formed froms hells, such as those with which many parts of the bottom of the ocean now abound, in prodigious quantities; and the skeletons of fishes, and other aquatics, often found in these masses, would in some measure seem to confirm this opinion.

Some of the stone, commonly called limestone, is combined with a large proportion of *magnesia*; of which earth we shall speak presently. Sometimes, also, limestone is principally combined with argilaceous, and sometimes with silicious, earth; the former being known by its hardness, and smoothness of surface when broken, and is the least calculated to improve a clay soil; the latter being distinguished by being more soft, and rough, when broken, and is best adapted for clays.

Marble is usually combined with argilaceous earth, and chalk is formed of nearly the same ingredients; but, perhaps, contains less alumine.

The upland marle is generally a clay, with a certain proportion of lime, and the more the better, as a manure. Sometimes, however, this kind of marle has a considerable proportion of sand; in which case, it may be found best adapted for clay soils; as, in the former case, it will be found most suitable for those which are sandy. The marle of bog-swamps also varies in its proportions of a fine rich clay, or loam, and of very fine sand; but, in all cases, contains more lime; and, the weaker sorts, probably, more earth formed of vegetable matter.

See further, MANURES.

There are also calcareous sands, which may be easily discovered by applying any of the acids to them, in the manner before directed. Sometimes, also, these sands are mixed with silex.

Magnesia is a white, friable, light earth, usually combined with other substances, and sometimes with limestone. When this is the case, the stone, when burned, makes what the English Farmers call *hot* lime; and, in Greatbritain, is esteemed of much less value, as a manure; but, in this Country, it is said to be most valuable.

The magnesian limestone may be known, from that which is purely calcareous, by the slowness of its solution in acids; as, even the softest kind of it, is longer in dissolving than marble. Frequently it has, also, a chrystalized structure; and sometimes small black dots may be seen interspersed throughout the mass.

Silex, or the earth of flints, is exhibited mostly in the form of crystaline sand.

Alumine is the basis of clay, and serves to endue that earth with the peculiar characteristic of contracting in bulk, when dried; and of expanding again, when moistened.

Animal matter, in a decomposing state, must be principally the remains of the various insects, and other animals, which have existed, and perished, in the earth, during the lapse of ages.

The presence of the remains of animal matter, in earths, is ascertained by applying a strong heat to them; under the operation of which they emit a smell similar to that of feathers when burning, and leave a residue which is principally carbonaceous matter, together with carbonic acid, volatile alkali, and inflammable aeriform products.

Vegetable matter, in a decomposing state, is much more apparent in almost every part of the surface of the earth; but most so in rich moulds, and in new lands, where the surface is usually more or less covered with it. It forms the upper stratum of bog-meadows, and indeed the whole mass, where they are not underlaid with marle. When it undergoes the operation of a strong heat, the residue is mostly ashes.

The saline compounds found in earths, or soils, are but rarely to be discovered, and are principally common salt (muriate of soda) epsom salt (sulphate of magnesia) and the salts chemically called muriate, and sulphate, of potash, nitrate of lime, and the mild alkalies.

Soils containing the least of any particular saline ingredient, that forms a part of the food of plants, will probably always be found most benefited by the application of that kind of salt, as a manure.

The oxyde (rust) of iron is found in all earths, or soils; but mostly in yellow and redish clays, and in sands of similar colors. It would seem that the colors of these earths are mostly owing to their containing more or less of this oxyde; and that, for this reason, they are usually the least fertile; as the presence of iron, in any shape whatever, in the soil, is unfriendly to vegetation.

But redish-colored earths are often very prolific; particularly of the loamy kinds; the cause of which may be, the presence of other fertilizing matter in the soil, that overbalances the effects of the iron; or, that the color is chiefly owing to some other cause.

When earths have been made as dry as they can be, by exposure to the air, they still contain a considerable quantity of water; the more clayey kinds containing about a fourth of their weight; while those which are light and sandy hold from a tenth to a twentieth part only of this fluid, according as the sand predominates more or less.

It would seem that this circumstance is principally what gives to clayey soils the advantage over those which are light and sandy; the former, holding more water, are enabled to impart to the growing plants more of this necessary food than the latter, particularly during spells of dry weather. The stiff and clayey soils may therefore be said, on this account, if on no other, to contain more of the food of plants than the light sandy ones.

But clays may, nevertheless, be too solid and compact to admit the extension of the roots of plants in search of this food; and, in such case, the stores of this nutriment are only to be unlocked by the application of sand, or some other substance calculated to destroy the quality of compactness and adhesion in the soil.

See MANURES.

Something shall now be said of earths, in regard to their forming different soils.

There are a variety of these; such as the *sandy*, *gravelly*, *loamy*, *clayey*, *marley*, *chalky*, *mucky*, *turf*, and *peat* soils. There are also soils formed of a mixture of some of these; such as the *sandy-loam*, *gravelly-loam*, *sandy-clay*, *gravelly-clay*, &c.

The *sandy* soil is that in which sand predominates; but which, at the same time, contains a sufficiency of other earthy matter to make it more or less retentive of moisture, and thus becomes endued with various degrees of fertility. A pure sand is wholly barren; being nothing more than a collection of very minute pebbles, which are usually of the stone we call flint; though sometimes they are of calcareous stone, as we have before mentioned.

Where a sandy soil is underlaid, and at no great depth, with what is usually called a *hard pan*, it adds greatly to the retentiveness of the soil, and of course to its fertility.

Sandy soils are usually of a yellowish, or redish, cast. Sometimes they are grayish; and frequently they are dark-colored. The latter are usually the most fertile: Generally, they are very productive; the yellowish and redish are commonly the least so; and the grayish usually holds a middle station between the two extremes.

Sandy soils are, commonly, most profitable in the cultivation of roots of almost every description; particularly when the soil is well manured, if it be not naturally rich.

Wheat is not very natural to this soil; but, when in good condition, it will produce tolerably good crops of this grain; particularly when sown on a sward of clover turned under. Rye is natural to this soil.

The lighter kinds of it are too little retentive of moisture, during the heats of Summer, for good crops of Indian corn; though those which are darker-colored are generally very good for this crop.

Some particular kinds of grass grow well in this soil, even where it is very light and dry.

See GRASSES.

Sandy soils have this particular advantage; they are easily tilled; so that, if what is saved in tillage be expended in additional manurings, it is doubtful whether this soil, when skilfully managed, will not be found as profitable to the Farmer as most other lands of midling quality.

See IMPROVEMENT OF LANDS, and MANURES.

Sandy lands are also much pleasanter to till, than most other soils; so that, if pleasure be an object with the Farmer, he will bring that into the account, when forming a proper estimate of the value of this soil.

A great proportion of the vast and populous empire of China is said to be more or less of sandy soil.

The county of Norfolk, in Greatbritain, which is said to be now among the most productive tracts in that Country, was, originally, for the most part, a poor light sand.

In this Country, sandy lands have generally been too little valued: They have been mostly occupied by poor Farmers, who have taken no pains, in the first instance, to give them more stamina, and thus fit them for profitable courses of crops; but, on the contrary, what little fertility they possessed has usually been exhausted in the production of poor crops, and thus the soil has at length, in many instances, become almost entirely barren.

The *gravelly* soil is that in which gravel forms the largest component part. Pure gravel, like pure sand, is barren; being nothing more than a collection of pebbles, of a larger kind than those of which sand is composed. A coarse sand, and a fine gravel, may be considered so nearly synonymous, that we will not pretend to draw the line of distinction between them.

Of the different kinds of stony matter which form the gravelly ingredient, in soils of this description, the slaty or schistic gravel is much the best; particularly where the slate is of a soft crumbly kind; as such would seem to be in a gradually decomposing state, and usually contains a considerable proportion of calcareous or other fertilising matter. We have seen some very good soils, which partook largely of a slaty gravel.

Generally speaking, soils which are very gravelly are hard, and they are usually poor, from much the same causes which contribute to the proverty of soils which are very sandy; and the means of ameliorating each are very similar. But as a hard gravelly soil is much more difficult to mellow than the sandy, the former is, on that account, the least valuable.

Hard gravels must be ploughed very deeply, in order to enable the growing crops to withstand the droughts of Summer. Roots which require a deep extension into the earth, and all those plants which are most affected by drought, have but little chance of succeeding in a gravelly soil of this description.

It is most effectually mended by casting earths upon it which are most retentive of moisture: At the same time, it is a soil that is extremely sensible to the operation of gypsum; and, with the aid of that manure, will produce good crops of clover, which, in due season, will enable the soil to bear a crop of rye to advantage; and in this way, or something similar, poor gravelly soils may be made to yield considerable profit.

But, as the soils which may be denominated gravelly are some more, and some less, so; some very hard, and dry, some mellower, and not so much affected by drought; we will not pretend to designate particularly the most profitable uses of soils of this kind, as much must depend on their particular character, and as those of the better kinds may often be found very good for most kinds of culture.

The *loamy* soil is a close, compact, retentive earth, and appears to be similar to clay; with this difference, however, that loam does not crack open when dried. It is also, in general, different in color from the most of clays; the poorer sorts of loam being of a pale yellow; the better sorts of a brownish color; and some are often found of a redish hue, which are endued with various degrees of fertility; though, generally, they are very good for almost every purpose of farming; particularly when of a dry and mellow kind.

The dark or brown-colored sorts are almost invariably good lands; but best, where they are dry and mellow. The darkness of the color probably denotes the presence of much vegetable matter in them.

Loams of every kind, whether wet or dry, are natural to grass: Some, however, which incline to become mossy, when they have been a few years in pasture, or mowing-grounds, require to be more frequently ploughed up; unless the growth of the moss be destroyed by scarifying and top-dressings. We have known gypsum to answer an excelent purpose, in extirpating the growth of moss in a dry loamy soil. This manure was merely scattered over the mossy ground in the Spring; when the moss soon gave way to a growth of white-clover.

Loamy lands are generally too cold, and often too wet, for bearing good crops of Indian corn; unless the ground be well warmed and mellowed, by suitable manurings, &c. Some of the dry, redish, and dark-colored kinds, however, answer well for this grain, as well as for almost every other growth. In general, loams are a good wheat-soil, unless where they are too wet; and even their wetness may be remedied by hollow-draining.

See that article.

A loamy soil will pay, as well as any other, for what manure is given it, if it be of the right kind.

See MANURES.

It is also much easier prepared for crops, than that of which we shall next speak; and, although loams are very various in quality, and in fertility, in general it may be said, that tracts of this soil will usually be found to contain much good farming-lands.

The *clayey* soil, is the most compact and retentive of any, and, on account of its alumine, has the singular quality of contracting when dried, and expanding again when moistened, as we have before mentioned. Probably the presence of this primitive earth, in this soil, is principally what serves to distinguish it from the more adhesive and compact loams.

Clay is an unpleasant soil to cultivate, for any hoed crops; and for those which are cultivated, solely with the plough, more skill, as well as more labor, is requisite in preparing this ground for the reception of seed.

See FALLOWING, &c.

To prepare a soil of this description for bearing a crop requires, on an average, at least double the expense that is necessary for light sandy soils. Clays are, however, strong and durable soils, and, when well cultivated, produce largely of such crops as are most suitable to them. These are, principally, wheat, where the soil is not too wet, barley, oats, beans, peas, vetches, flax, &c. beside several sorts of natural and artificial grasses.

Rye is not so natural to clay. Indian corn, and the various kinds of root-crops, do not flourish in this soil, unless they are powerfully assisted by suitable manures.

Clay, however, by long cultivation, and frequent manurings, in a great measure loses its original character; that adhesive quality, so troublesome in tillage, mostly disappears, and the soil assumes more of the qualities of loam.

The *marley* soil is merely a clay with a mixture of more or less lime. It is a strong, durable soil, and is more easily fited for crops than clay, as it has little or none of the adhesion of that earth, being more loose and crumbly. It is better fited for those crops for which clay is not so well adapted; but, at the same time, is best for those which are best suited for clays.

It is a kind of soil that is not often found in any considerable extent, as far as our observations have extended. In point of color, it probably corresponds with those of clays; and, no doubt, has different degrees of fertility, according to the qualities of the clay, and of the lime, of which it is composed.

The *chalky* soil is very rare in this Country. We never have seen any of it, except in small quantities. It abounds considerably in England; and in some parts of that Country, where the surface is wholly chalk, it is, of course, entirely barren. Pure chalk is principally lime, saturated with carbonic acid. In appearance, it does not essentially differ from the white marle, with which some bog-swamps are underlaid.

The *mucky* soil appears to be almost entirely the remains of vegetable matter. It forms the upper stratum of bog-meadows and other rich swamps; and many rich tracts of our wild arable lands have a surface, of a greater or less depth, of this earth. In lands of this latter description, it seems to decompose, and disappear, in a greater or less degree, when the ground has been tilled fifteen or twenty years.

Mucky soil is best, when mixed with a due proportion of other suitable earth; and in that case it forms a fine rich soil for tillage, and is well adapted to the growth of almost every kind of crop. The soil of bog-meadows, though very rich to appearance, may, nevertheless, be greatly increased in fertility, by having a suitable quantity of other earth mixed with it.

See MANURES.

Of *turf* soils we cannot say much, if we speak of the surface, or cultivable part of the earth, further than that all rich swards are frequently called turf, and with some degree of propriety; as such swards, when cut up and dried, will answer tolerably well for fuel. But that which is here intended to be particularly spoken of is a fossil, that is generally found in low grounds and boggy places; sometimes extending as high as the surface; but generally lying underneath.

It is sometimes confounded with peat; but this would seem to possess different qualities. Where turf has been dug up, the hole thus made will grow up again, after a number of years; but this is not the case with peat.

Turf would seem to be a mass of vegetable matter, in a partly decomposed state, mixed with a large proportion of living roots of aquatic plants extending through it; and it is probable the addition of vegetable earth, which is produced by the constant growth and decay of these, that causes places from which turf has been dug to fill or grow up again.

In Holland, much turf of this description is taken from the bottoms of the canals, and is used for fuel.

Ireland abounds much in low sunken tracts, which are often chiefly composed of turf, or of peat; of which we shall now speak, and conclude with some observations of these earths which may be more or less applicable to each.

Peat soils sometimes form the surface of the earth; sometimes again this earth is found at various depths underneath, in a more compact form. It abounds much in the cold mountainous tract of land which forms the northerly and unsettled part of this county (Herkimer) and its vicinity. The surface of the earth there is, in many places, composed of a mass of peat, forming a depth of from one to two, and sometimes three, feet.

The timber, where the peaty earth prevails to such extent, is mostly spruce and hemlock. The peat thus formed would seem to be principally the remains of the trees which have sprung from the soil, and in time have become decomposed, to a certain extent, during the course of many thousand years.

Heat and moisture are the principal agents, both in producing and destroying. They cause animals, and vegetables, to expand and grow to maturity; and when they become diseased, and no longer fit to sustain life, the same principles of heat and moisture, which before gave life and nurtured them, suddenly decompose them and cause them to return to dust. Without heat and moisture, there could be no vegetable or animal existence, in the first place; nor any change or decomposition of them, after they had once been formed.

But it requires a certain degree of heat to entirely decompose animal or vegetable matter, of any kind; while, at the same time, the decomposition of either may be in part, or entirely, prevented by the presence of other substances, which are calculated to preserve them from its operation. Thus the Egyptians had an art of embalming animal bodies, so as to enable them to withstand the operation of heat, for thousands of years.

Thus, lean animal flesh, by being immersed in runing water a given time, becomes changed into a substance called *adipocire*, resembling spermaceti; and in this state would probably almost bid defiance to the ravages of time.

And something similar to this may be observed of vegetable matter, particularly of the hard and woody kinds: The more solid parts may remain for unknown lengths of time, when buried beneath the surface, in earths, and in temperatures, suitable for preserving them; while the parts, which are more easily changed, will decompose to a certain extent, and thus form a mass of peaty or turfy matter, which will serve to preserve the sounder wood from decomposition or decay.

Such seems to be the case in Ireland. In many of the bogs of that Country, trunks of trees are taken up entire and sound; while all the rest has become converted into peat, or perhaps turf.

Peat, when found below the surface of the earth, is a much more solid and compact substance, than that found on the surface; and when dug up, and exposed for some time to the air, becomes hard, like a cinder. When put in compost, in which lime is an ingredient, it readily undergoes a further decomposition, and becomes converted into a substance similar to muck, or the black dirt of bog-meadows.

Turf, in composts, will also undergo a similar change; though this earth will gradually decompose, or rot away, by mere exposure to the air. Such, too, is the case with the peaty earth, before mentioned, found on the surface, and which, on this account, might more properly be classed with turf, did it not differ from that earth, in never growing again, when a part of it has been cut away. Probably this kind of peat should only be identified with that which is found below the surface, by being long placed in a similar situation.

The fossil peat, or that which is found under the surface, burns very freely, when dried, and is superior to turf, as an article of fuel. Peat of this description may also be converted into charcoal, and the red sort, Mr. *Elliot*, of Connecticut, says, is better for this purpose than wood. The method of converting it to this use is similar to that for wood.

See Fuel.

We will now say something in regard to soils which are particularly designated, as being formed of a mixture of some of the principal earthy ingredients; although, in strictness, almost all soils are, more or less, composed of mixed ingredients.

The *sandy-loam* soil is generally composed of about equal quantities of what is called a sandy and a loamy soil, mixed together; and as each of these soils has various degrees of fertility, the quality of a sandy-loam may depend, for its fertility, upon the sand, or the loam, of which the soil is composed, and sometimes on both united.

A rich sand, and a rich loam, when united in proper proportions, form a most excelent soil; while, at the same time, a poor yellow sand, united with a poor hard loam, form but an indifferent soil; though it may be much imimproved by manuring.

Generally speaking, sandy-loam soils are nearly equally good for all kinds of products, excepting for grasses which require moist or wet soils. Taking all the good qualities of this soil into consideration; the pleasantness, and ease, with which it may be tilled; its suitableness to such a variety of crops; its being suitable to gypsum, one of the cheapest of all manures; and its forming one of the best kinds of earth for roads; all these circumstances tend to enhance the value of this kind of soil, and to render it one of the most valuable which generally falls to the lot of the Farmer.

Of the *gravelly-loam* there are also varieties of soil, in point of fertility; some forming very fine soils, and some but indifferent; the soil, in this case, forming its character mostly from the quality of the loam; though often from the kind of gravel with which the loam is mixed. A due proportion of schistic, or slaty gravel, mixed with loam of a good quality, must naturally form a very fine soil; while, on the contrary, coarse gravel, especially of the flint kind, when mixed with a poor loam, must form a soil of no great value for cultivation. Poor, dry, gravelly-loams are, however, greatly assisted by the use of gypsum.

A *sandy-clay* is a kind of soil that does not often prevail, to any great extent. A good clay, with a due proportion of good sand mixed with it, must naturally form a good soil for most purposes: Not so good, however, for Indian corn, and for most kinds of roots, as a good sandy-loam.

A *gravelly-clay* is also but seldom found, and is commonly of but poor quality; as a rich clay has seldom or never any gravel in it.

The degree of fertility which any soil may possess, is not always to be estimated by its general appearance. Much depends on the ingredients of which the soil is composed.

Mr. *Davy*, of Greatbritain, makes mention of a very fertile soil, for grain, at Ormiston, in that Country, which contained, in one hundred parts, eleven of mild calcareous earth, twenty-five of silicious sand, and forty-five of finely-divided clay. It lost nine parts in decomposed animal and vegetable matter, and four in water, and afforded indications of a small quantity of phosphate of lime.

He attributes its extreme fertility to the presence of the phosphate, as this is found in wheat, oats, and barley, and is, probably, part of their food.

The soil of the lowlands of Somersetshire, which is famous for producing wheat, and beans, without requiring any manure, he found to consist one-ninth of sand, chiefly silicious, and eight-ninths of calcareous marle, tinged with iron, and about five parts in the hundred of vegetable matter.

This soil contained no phosphate, or sulphate, of lime; and he attributes its fertility principally to its power of attracting vegetable nourishment from water, and from the atmosphere.

Sulphate of lime (gypsum) has little or no effect, as a manure, on lands in Greatbritain. Here, it operates powerfully on much of our lands. The soil, then, which is found so productive in that Country, might not be found equally so in this.

Mr. *Tillet*, in some experiments made on soils near Paris, found that one composed of three-eighths of clay, two of river sand, and three of the parings of limestone, was very proper for wheat.

By analysing the most fertile soils, in different parts of the Country, and comparing the results with those which are poor, in the same neighborhoods, the deficiencies of the latter might be readily ascertained, so as to be enabled to point out what additions of earths, or other substances, are requisite for the most permanently bettering the condition of the poorer lands.

Were the researches of Chemists directed to this branch of the science, it is believed that very important benefits to the Community might eventually be the result. But this seems to be properly a national, and not an individual concern. Were the Chemist to make the most important discoveries, in his researches in this branch of the science, the result, with whatever expense attended, could be of little benefit to himself, further than gratifying his love of fame; while, at the same time, the farming interest might derive immense benefit from his labors.

Governments might, therefore, be acting more wisely than is generally imagined, by establishing National Farms, and supporting the expenses of chemical researches in this particular, as well as every other that may tend to the advancement of agriculture. The expense of institutions of this kind would be but trifling, compared with the national benefits which would probably be derived from them.

We shall close our observations on this recondite subject, with observing, that earths, or soils, may be productive of very different degrees of fertility, according as they may be found in different situations, as well as in different climates.

A stiff clay, for instance, in a very cool moist climate, might be found unfit for crops of grain; but, let the same clay have an understratum of sand, at the depth of about ten or twelve inches, and its character for fertility would be much altered for the better. At the same time, a similar clay, when placed under the equator, would probably not be essentially benefited by an understratum of sand.

A light sandy soil, in the climate first mentioned, may easily be rendered productive; while the same earth, when long laid bare to a burning sun, may become a frightful barren waste, where the sand is blown about by the winds. Yet, in such climate, if the same earth were underlaid with clay, at a proper depth, the soil might be found tolerably productive.

ELM (*Ulmus.*) A beautiful tree to plant near houses, and elsewhere. It grows pretty rapidly, and is very long-lived. There are three varieties, the white, the yellow, and the red elm. The two latter are the best timber for any kind of use, and the latter in particular is very durable.

ENCLOSURES. Throughout the most of France, and some other parts of Europe; the arable and mowing-lands are not fenced, but lie in common; while the lands on which cattle are usually kept are enclosed.

This method of husbandry has some advantages; and it has its disadvantages. Much is thereby saved in the expense of making enclosures; but when cattle are to be fed on uninclosed grounds, as must sometimes be the case, they must be watched, to prevent their straying away, or geting into mischief. This, says Mr. *Livingston*, is generally done by the Women: They may be seen at all times, during the season of pasture, siting in the fields employed in spining, while the keeping of the cattle within their proper limits does not require their immediate attention.

It may be difficult to determine, whether this method of farming may not, on the whole, be as good as any, in a highly-cultivated and thick-settled country. Be this as it may, those countries which have adopted this method will hardly ever be found to change, owing as well to the inconvenience of producing, throughout a whole country, so radical an alteration, as to the difficulty of overcoming prejudices, which are almost inseparable from an ancient and hereditary custom.

EXPERIMENTS. There is no way of making improvements in farming, but by experiments. If the Farmer is informed of, or has conceived, a different and better method of culture, or managment, in any branch of his farming, he is to test the goodness of that method by experiments; and, if these prove successful, he may congratulate himself, on having performed an act which is serviceable to his Country and honorable to himself.

Perhaps it would be well, if some institution were devised, and supported at the expense of the State, which should be so organized as would tend most effectually to produce a due degree of emulation among Farmers, by rewards and honorary distinctions confered on those who, by their successful experimental efforts and improvements, should render themselves duly entitled to them. It might also be advisable to have two or three experimental farms, in different parts of the State, under the direction of suitable Superintendents, who should have the profits of the farms to themselves, and who should be excited to a degree of emulation, by a reward given yearly to that Superintendent which should be found the best entitled by his superior culture, and by the success of his experiments, when duly authenticated, and published yearly for the benefit of the Community. Something like these might cost considerable at first; but might eventually be made the means of greatly enriching the State, by improving its agriculture.

F.

FALLOWING OF LAND. Summer-fallowing has a twofold use; to meliorate all the harder and stiffer kinds of soils; cleanse those of every kind, of the seeds, and roots, of weeds.

Mr. *Tull*, and some other British agricultural Writers, have contended, that Summer-fallowing should never constitute a part of a good system of husbandry; that the necessity of fallowing may be obviated, either by the adoption of the system of new husbandry advocated by Mr. *Tull* (*See* NEW HUSBANDRY) or by a judicious rotation of crops: And the rotation contended for, as the most proper, is the tillage of leguminous, and of culmiferous, crops alternately; or, in other words, that a crop, which requires only the use of the plough, should be followed, or preceded, by one where the use of both the plough and the hoe is necessary. The hoed crops, in this case, are relied on as being sufficient for the purpose of eradicating the seeds, and roots, of weeds.

The Writer, however, of the article AGRICULTURE, in the late edition of the Edinburg *Encyclopedia*, contends, in part, for a different practice. He admits that light dry soils, such, for instance, as constitute the county of Norfolf, in Greatbritain, may be successfully cultivated without the intervention of a Summer-fallow; but he insists that this part of husbandry cannot be well dispensed with, in all the stiff and cold soils which abound in that island; that in these an effectual Summer-fallowing is essentially requisite, as often as once in every four, six, or eight years, according to the nature of the soil; not only for the purpose of cleansing it of the roots, and seeds, of weeds; but also to counteract the stiffness and sourness which such soils acquire, when yearly tilled with crops.

It is believed that this Writer has the most correct notion of the culture most suitable to his Country: But it should be remembered, that the climate of Greatbritain is essentially different from that of every part of this Country; our Summers being much warmer, and our atmosphere much drier. Nor do the cold and stiff soils, which compose three-fourths of that Island, abound much in the United States; though most in its more northerly parts.

We have more of the light, and of the warm dry, soils. Still, however, though our soils and our climates differ essentially from those of the Country in question, it must, nevertheless, be admited, that our hard, and our heavy, soils, stiff particularly, are much improved by an effectual Summer-fallowing; that those of the two latter descriptions will probably, at certain intervals, require this mode of culture, for pretty much the same reasons that it is found necessary there; and that even our best arable soils will, at times, require it, for the purpose of cleansing them, until such time as we learn to destroy the growth of weeds, among the hoed crops, by a more effectual cultivation.

But, admiting that in our lands, of the latter description, more pains were taken, with the hoe, and otherwise, to eradicate the growth of weeds, and to prevent any from going to seed; it is contended, that, with a suitable rotation of crops, Summer-fallowing such lands would never be found necessary, for any profitable purpose.

There is no doubt that good arable soils will be considerably fertilized by this mode of culture, where it is effectually performed, by repeated ploughings, and harrowings: But, taking into account a year's rent of the ground, which is thus lost, it is too expensive for the mere purpose of enriching lands. It can only be profitable when it answers the double purpose of sweetening and fertilizing the soil, and, at the same time, riding it of its liability to troublesome growths of weeds.

At the same time, it may be truly said, that, for this latter purpose, much of the lands of this Country require an effectual Summer-fallowing: Having been but imperfectly cultivated, in general, they are usually to be found much infested with the seeds of the common bienniel weeds; the growth of which, among the growing crops, is not only injurious to them; but also tends very considerably to exhaust the soil. Weeds growing among any crop, must lessen its product, in the proportion which the weight of the growing weeds bears to the weight of the growing crop.

What we call Summer-fallowing, in this Country, hardly deserves the name: It is very different from that performed by the best English Farmers. They break up the ground early in the Spring; and they plough from five to ten times, as the state of the ground may require; and the ground is well harrowed between each ploughing: In short, they plough and harrow, at proper intervals, till no further growths of weeds start from the soil.

Thus, suppose the ground is turned over by the middle of April; by the middle of May a growth of weeds will have sprung up from the seeds of weeds in the soil, which, by the ploughing, will have been brought sufficiently near the surface to vegetate: These are to be destroyed by an effectual harrowing. This operation brings other seeds near the surface, which produce a fresh crop of weeds: Plough these under, and this raises other seeds, which then vegetate and grow. Destroy these with the harrow, as before, and this again raises the seeds for another crop; which are again ploughed under: And thus the work proceeds, at proper intervals, until all the seeds of weeds in the soil have successively vegetated, and been destroyed.

By this culture, most kinds of soils are very considerably improved; though all not equally so; and they are put in the best condition for growing of crops. It tends greatly to destroy the adhesion of clays for several successive crops, as is asserted by the Writer last mentioned; it sweetens those soils which are sour, and it warms those which are cold.

The soils which are least enriched, by this mode of culture, are those which are naturally very rich and mellow, and poor weak sands. The former gains nothing in fertility, for pretty much the same reason that a heap of well-roted and fermented compost would gain nothing, but rather lose, by being too frequently stired up, and every part exposed to the sun, winds, and rains.

It would seem that all masses, that are saturated with fertilizing matter, loose by frequent stiring up, and exposure to the atmosphere; while hungry earths, sand excepted, gain more or less by the same process. Probably sand, by being too much mellowed, becomes less capable of retaining moisture. At all events, give this earth a good mixture of clay, and it will then receive additional fertility by a fallowing process.

For the purpose of clearing the fallow of the roots of any weeds, or grass, which may infest it, the Writer last mentioned directs that, after the ground has been well mellowed, as before directed, a roller should pass over it; and then the harrow will more readily drag the roots to the surface, where they will die, if the ground be sufficiently dry.

The process should be repeated, until the soil is cleansed of them. The teeth of the harrow should be sharp, for the purpose, and they should be turned considerably forward, at the lower ends. Harrow-teeth should always have this shape, when used in smooth grounds.

The roller is also of essential use, for breaking the baked clods in fallow-lands of a clay soil. The ground is to be harrowed till the clods are all brought on the surface; and then, by passing the roller over them, when they are neither too wet, nor too dry, they will pulverise very readily. The most favorable time for this is, after the clods have been once fully dried, and then merely wet through again with a gentle rain; then, when they are partly dried again, they will be easily crumbled.

On the whole, it may be laid down as a general rule, that Summer-fallowings are not necessary in this Country on any smooth, level, and dry soil, where a suitable rotation of croping can be properly pursued, unless the soil be unfit for hoed crops; as a proper intermixture of these, if the ploughings and hoeings be done effectually, will sufficiently extirpate the growths of weeds in the soil.

But, where the land is too stiff and clayey, for the growth of such hoed crops as are suitable to be raised in this Country, there occasional Summer-fallowings may be found requisite; though they need not be near so frequent, as is common amongst our Farmers.

The objections to Summer-fallowing are, the additional expense, if performed as before directed, and the loss of a year's croping of the land: The benefits to be derived from it, in general, are the additional fertility which the soil thus derives, and its being freed of a superabundant growth of weeds.

When, therefore, each of these benefits may be expected to accrue, in an ordinary degree, they will usually warrant the expense; but, generally speaking, not otherwise; unless the cleansing of the soil becomes highly requisite, or unless it be so stiff, or sour, that nothing short of this process will sufficiently mellow or sweeten it.

Sometimes a process, similar to a complete Summer-fallowing, may be found essentially requisite for old meadows, of rough bottom, and clayey soil, and where the grasses have failed; not only for giving such lands a smooth furface; but also for greatly increasing, and improving, their products; and sometimes it may be found requisite to commence with a previous Winter-fallowing, in order completely to mellow the soil, for being, in due time, sowed with grass-seeds, the ensuing season.

A complete Summer-fallowing is also the best preparative for a crop of flax.

See that article.

Much of the lands of this Country undergo what may be called a Summer-fallowing, in part, when intended to be sown with Winter-wheat, or rye; that is, the sward is usually turned over in June; and then two ploughings more, and perhaps three harrowings, are given the ground, before the sowing is completed.

Formerly, no grass-seeds were sown with the crop; but, during the following years, in which the land was suffered to rest, the supply of pasture it afforded was merely its natural growth, which was usually of small account. The crops of grain thus raised were generally proportionate to this poorness of culture: After deducting from the crops a very moderate rent for the land, the remainder, generally, did not pay the Farmer for his labor in raising them.

Fortunately, however, the use of gypsum has greatly encouraged the use of red-clover; and the difference which this grass, with the aid of that manure, has effected in the quantity of the grain thus raised, has probably served to convince the more enterprising Farmer, that formerly this part, at least, of his husbandry was very contemptible.

Now he finds the average of these crops to be, perhaps, twenty bushels an acre: Formerly they were about half that quantity. Now, the *clear profits* in the crop, by the acre, are, perhaps, from six to eight bushels of wheat: Formerly they were nothing. The stunted growths of grass, with which his fields were formerly clothed, did not usually afford pasturage sufficient to pay a very light rent of the ground; while at present the two Summer's growths of clover, after deducting the expenses of seeding, gypsum, &c. will afford him at least as much clear profit, as he derives from his crops of grain; and, in the mean time, his lands are gradually increasing in fertility.

By this culture, too, if his lands are smooth, and tolerably mellow, he may obtain his crops of grain with no further ploughing, than the mere turning of the sward under. At all events, if they are too hard, or too rough, for this, he may, nevertheless, get them into better order for sowing, with the same labor he formerly bestowed on them.

And, as a sward of natural grasses usually requires much longer time to rot, than a sward of clover, he need not break up the latter before the first of August; by which means he reaps nearly all the benefit which the second season will afford of this grass.

In this way, a season is not lost by fallowing; and, on the whole, it is pretty profitable and good culture for much of the rough arable lands of this Country, which have not been fited by Nature, or by art, for the finest cultivation.

But the English Farmers say their lands will eventually become *tired* of bearing clover, or wheat, too constantly. Perhaps the same will be the case here. If so, it will indicate the necessity of fiting such lands, if practicable, for a more perfect culture, by judicious rotations of crops; or, at least, of appropriating them to the growing of other grasses, and grain.

But, as there is nothing like Summer-fallowing, properly speaking, in thus raising alternate crops of clover and wheat, or rye, that process would probably be found necessary, at the end of every ten or twelve years, to cleanse the soil of its increasing growths of weeds. Particular care would also be requisite, to keep out all grasses from the soil, but the clover; and this would be most easily and effectually done, by repeated harrowings before, and after, sowing the crop of Winter-grain.

What is called Summer-fallowing in this Country is often thought necessary, by most of our Farmers, for the purpose of roting a stiff sward; but this can be effected equally well by a Winter-fallowing, and without any loss by the ground being unproductive during a season. Thus, if a stiff sward be turned under by the first of November, it will be found sufficiently roted, for most crops, the ensuing Spring; and, with proper managment, the Spring-crop may be advantageously followed by a Winter-crop, or by another Spring-crop, as may be found most suitable to the soil.

Winter-fallowing ought to be more attended to in this Country; and, in most cases, it should be the substitute of such Summer-fallowings as our lands usually receive. All Spring-crops should be preceded by this process, unless preceded by hoed crops; and even where a hoed crop is cultivated on a clayey, or a wet soil, the ground should be thrown up into high narrow ridges in the Fall, in order to be more easily and effectually mellowed the next Spring.

Indeed, in all cases, where soils of the descriptions last mentioned are intended for Spring-crops, they should be thrown up into high narrow ridges in the Fall. By this mean the Winter-frosts will more readily crumble and mellow the soil, and thus fertilize it; and by its lying more dry, when in ridges, it is the more readily brought into a proper tilth, and a due state of fermentation, the next Spring: And these are points of the utmost importance in such soils; as the finer the tilth, and the greater the fermentation to which they are brought, they will be rendered so much the more fertile for succeeding crops.

See FREEZING, where a case of Trench-ploughing is mentioned which serves fully to illustrate the truth of this remark.

In light sandy grounds, a Winter-fallowing is not so essentially requisite, for some kinds of Spring-crops; neither does this process tend to fertilize such soils: But in all such as are harder, or more or less gravelly, a Winter-fallowing of sward-ground should, generally, precede a Spring-crop, for the better preparing of the ground; and all such soils as are wet, sour, cold, or clayey, should undergo this process, as well as that of ridging, for the double purpose of better fiting the ground for Spring-use, and of meliorating the condition of the soil.

After having thus stated the principal uses and benefits to be derived from fallowing of land, it remains to say something, in regard to the difference of climate, between this Country and Greatbritain, in order that the Reader may, with more accuracy, determine how far Summer-fallowings, here, are necessary, for the soils before mentioned, for the reasons that they are found requisite in that Country.

Vegetation begins earlier, and ends later, in Greatbritain than it does in any part of this State; but, owing to the growing season there being much cooler than with us, the progress of vegetation is feeble and languid; and the circumstance of their crops of grain, and grass, never growing to so great a height, as with us, shows that the whole mass of the vegetation, of a season, is less in that Country than with us. Wheat-harvest is from four to six weeks earlier here, than it is there.

It remains, then, to be inquired, whether our lands could not be, in a very considerable degree, cleansed of the seeds of weeds, by a mode of culture which would effect little or nothing in that Country.

Suppose that the stubble of our wheat, rye, barley, or oat-crops were turned under, as soon as the ground was cleared of those crops; could there be any doubt that by three ploughings, and three harrowings, at proper intervals, the ground would receive at least one-third of the benefit, in regard to destroying the seeds of weeds, and sweetening and fertilizing the soil, that it would receive by a complete process of Summer-fallowing?

Yet little or nothing could be effected, in the same way, in Greatbritain; for, before the same culture could be attempted there, the season would be too far advanced.

It may then, with truth, be said, that Summer-fallowings may more readily be dispensed with in this Country, than in that, by more frequently giving the ground a partial sweetening, and cleansing, in the manner last mentioned: But, at the same time, it will readily be seen, that nothing short of a complete Summer-fallowing will, at any time, effect the complete cleansing and melioration of the soil.

See further, PLOUGHING.

FALSE QUARTER. A rift or chink in the hoof of a Horse from top to bottom. The inner side of the hoof, being the thinest, is most liable to it. When it becomes troublesome to a Horse, *Gibson* directs that the cleft be pared out to the quick; then annoint the hoof with a mixture of tar, honey, and suet, melted together, and lay a pledget, dipt in the same, along in the cleft. Then bind up the hoof as tight as possible, by winding rope-yarn closely round it from top to bottom. The shoe should previously be taken off. The wound should be opened and drest every third or fourth day; and, to prevent any inconveniency from this, let the cleft be held together at the bottom by a thin plate fastened on for the purpose.

It is, however, very difficult, and often impossible, says this Author, to effect a cure in an old or a diseased Horse.

FARCY. A disease in Horses similar to the scurvy among Men, and is caused by confining a Horse too long to dry meal. It is known by small tumors appearing on the head and other parts of the body. Turning the Horse to fresh pasture will effect a cure, in the first stages of the disorder; but where it has become more inveterate, by long standing, *Gibson* directs, that the Horse be bled, moderately purged, and then, that doses of antimony be given him.

FENCES. Poor fences are productive of incalculable mischief to the Farmer. By these his crops are constantly liable to be destroyed, and his cattle learn to become habitually unruly. One unruly creature will learn others to be so; and thus the Farmer, with his poor fences, finds his cattle, instead of being profitable, to become productive of unceasing losses, and, what follows of course, of unceasing vexation.

When the Farmer is conscious, that he cannot even sleep in peace, on account of the danger of his cattle destroying the fruits of his labors, he cannot be said to enjoy that tranquility which ought to be the reward of the sweat of his brow. Rather, therefore, let him make his fences what might be generally deemed more than sufficiently high and strong, than too low and weak. This, if it be an error, is erring on the safe side; on the side which secures the fruits of his labors, and promotes his tranquility and happiness.

Log-fences are often made on new-cleared lands, where rail-timber does not sufficiently abound, and these the Farmer will of course make of the most durable logs which his new-cleared land affords. White-pine log-fences are very good, and will last twenty years without any essential repairing. Clear white-pine timber may, however, be split into rails, which are very durable. All kinds of wood will last much longer in rails, when the bark is peeled off.

What are called worm-fences are made with most ease, but require more timber than some other kinds. If, therefore, timber be scarce, post-and-rail fences, set in a bank, made of the earth of two small ditches thrown up together, ought to be prefered, where good durable posts can be had. If the posts are too small to have holes made through them, the rails may be flated at the ends and fastened to the posts with spikes, or with wooden pins well secured.

Post-and-rail fences, without these ditches on each side, are very good where the soil is dry, and the same may be observed of board fences; but, where the soil is wet, the posts will be thrown out by the frosts. In all cases, the posts ought to be set at least two feet in the ground. Red-cedar is best for posts. Locust, chesnut, butternut, and black-walnut are also good. Good oak will also last pretty well. Burning the ends of the posts which go into the ground, so as to make them black, will make them last longer.

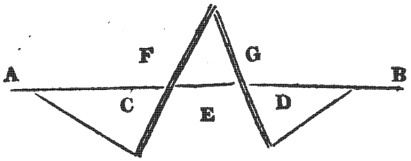
A method of making a fence from two shallow ditches, by laying up the contents of each in a bank between them, is in successful operation in Dutchess county, in this State, and is well adapted for lands lying moderately level, and free from stones. It is made to answer without any addition to the top of the bank; but, we believe, the addition we shall describe would generally be found most advisable.

We propose, for instance, to raise the bank three and a quarter feet high from the bottoms of the ditches; and, for this purpose, the ground is to be marked out as follows. A strip, say 18 inches wide, is first to be marked with a line, to be left as a foundation on which the bank is to be raised.

Then a strip, say, four and a half feet wide, is to be, in like manner, marked off on one side of this; and another, four and three-quarters wide, marked off on the other side.

From these two latter strips the sward, to the depth of, say, three inches, is to be pared off, and laid-away on each side, to be used in the way we shall presently mention. Then the earth under the pared ground is to be dug out, in the sloping direction exhibited below, and laid up on the strip first mentioned, so as to form a bank eighteen inches high from the surface of the earth. Then the sward, pared off as just mentioned, is to be laid with the grass-side upwards, on each side of the bank, from the bottoms of the ditches to the top, which completes the bank.

We will now exhibit an end-view of the bank as thus made, and covered with the sward, and of the slopes of the two ditches, which we imagine will afford an adequate idea of the construction of the whole.



A B	The ſurface of the earth.
C D	The ditch on each side of the bank.
E	The bank.
F	The sward laid on one side of the bank, taken from the surface of the ditch C, which is four feet and three-fourths wide. This sward laps, at the top of the bank, over that on the other side.
G	The sward laid on the other side, taken from the surface of the ditch D, which is four and a half feet wide.

But, in order to make this bank what we would call a sufficient fence, it will be necessary to make an addition to it, by driving stakes into the top of the bank, say, six feet apart; and to these nail one length of boards, say, fourteen inches wide, and at the height of about four inches from the top of the bank.

This gives the fence the height of about four feet nine inches from the bottoms of the ditches; which height, considering the particular advantage of this kind of fence, of which we shall next speak, will, as we imagine, be found sufficient to turn the most unruly cattle.

The advantage of the fence consists in this: The elevation of the bank, with its addition, is too great for cattle to attempt to climb up, and pass over in that way; and it will be found impracticable to pass it by a leap; because, in coming sufficiently near it, for that purpose, the forefeet of the beast must be so much below the level of its hindfeet, that it becomes unable to raise itself to spring to any advantage.

A hedge may in the mean time be growing on the top of this bank; and, when it has become sufficiently matured, the addition of the stakes and boards may be taken away, to be used in some other place.

For hedge-fences, *see* HEDGES. For making stone-walls, *see* STONES.

FERMENTATION. Ground is in a complete state of fermentation, when the adhesion of its particles is destroyed; when it is in a soft puffy state, so that when pressed down it will expand again. It is to be brought to this state by frequent ploughings, or by ploughings and manurings together.

When ground is in the highest fermentation, it is then in the best state for growing of plants; and the more effectually the fermentation is kept up, during the time in which the plants are growing, the greater will be their growth.

Frosts have great effect in preparing for a state of fermentation in stiff soils, when thrown up during Winter, in such manner as to lie dry.

See FREEZING.

Moderate rains succeeded by warm sunshine, have also a similar effect on such soils.

During the Summer-season, a proper state of fermentation is only to be produced in the soil when it is neither too wet nor to dry. Poughing, however, when the ground is very dry, if not so good for producing a state of fermentation, is, nevertheless, good for killing all weeds and grass, with which the soil may be infested.

FERN *(Polypodium.)* This weed grows in some cold loamy soils in the northern parts of this State; but it appears to be easily extirpated by tilling the land. In the northern parts of Europe, it is in many places troublesome and difficult to subdue. They, however, esteem it much when made into manure, as it contains a large portion of alkaline salts. In some parts of the north of Europe, they burn it, and gather the ashes, which, being weted with water, are made into little balls, and dried in the sun, and are then esteemed to be nearly as good as soap, for the purpose of washing.

Barilla is made from fern, by burning the plants in kilns, so that no air can approach them during their calcination.

FLAX *(Linum.)* Such crops of flax as are usually raised do not pay for the labor bestowed on them. This must be owing to bad management. As this is a crop that the Farmer must raise, if he has any regard to Domestic Economy, the means of raising it to advantage should be duly attended to.

A good method of raising a great crop of flax is as follows: Summer-fallow a piece of ground of suitable soil, and give it six or eight ploughings and harrowings, during the Summer, so as as to destroy all the seeds of weeds. Apply your manures during the first ploughings, unless they be composts, or top-dressings; at all events, let the soil be eventually made rich enough for hemp.

The next Spring, mellow the ground well again by two or three ploughings, harrow it, and sow, of well-cleaned seed, at the rate of about three bushels to the acre, and harrow it in lightly. Give the ground a top-dressing, of about four bushels of fine salt to the acre, and also some gypsum, if the soil be suitable. Let the crop be sown about the first of May, or as soon as the ground can be effectually prepared, after vegetation has commenced. By five or six hundred pounds of flax may be expected from this method of culture, and with a proper change of seed, the acre, of a fine quality.

This is probably about the best culture; and all deviations from it, by less expensive methods in preparing the ground, will, generally, be so much for the worse. Ground may, however, be pretty well prepared for a good crop by previous hoed crops, which have been well manured, particularly if pains be taken to prevent any weeds going to seed in the Fall. Weeds are the enemy of flax; and no good crops can be raised on ground that is full of their seeds, even though it be sufficiently rich and well prepared.

See further, FOLDING OF LAND, for a proper method of preparing the ground for flax.

In addition to the requisites of a rich earth, free of the seeds of weeds and well mellowed, for obtaining a good crop of flax, another requisite is, that the ground shall not have borne flax, for as much as seven years previous to the time it is to be sown with this crop. Almost every soil, that is sufficiently dry for a proper degree of fermentation, may, by being well prepared, as above directed, be made to yield good crops of flax, unless the soil has too little moisture, as may be the case with dry gravelly and light sandy earths.

But a very essential point, in raising great crops of flax, is to have frequent change of the seed.

See CHANGE OF SEEDS.

The quantity of seed sown should be proportioned to the strength of the soil. Flax of good length, but coarse, may be raised on a soil far from being rich, if it be well mellowed, clear of weeds, and sown with not more than three pecks of seed to the acre. We have seen four hundred and fifty pounds raised from one bushel of seed, sown on better than an acre and a half of ground. Such flax is, however, not so well fited for fine spining. Where the stalks stand so thin as to branch at the roots, they also branch widely at the tops, and, though more seed is in such case to be expected, still the lint will be less in proportion, and of a coarser quality.

If flax is to be water-roted, it should be pulled as soon as the blossoms have fallen off; and at this time the coat of the stalk is stronger than afterwards. The ground also which produces the crop is less exhausted, than when the crop has stood until fully ripe. If it is to be roted on the ground, it should stand until nearly ripe; and then the seed can be saved, which is a matter of some consequence. That which is designed for affording seed, for sowing again, should have the seeds ripened most before pulling.

The process of water-roting flax, which is almost wholly practised in Ireland, is very similar to that of water-roting hemp, and the same precautions are requisite.

See Hemp.

Probably the method of roting by boiling, as mentioned there, might be found equally proper for flax. The method common in this Country, of roting on the ground, is so well known, that it is useless to say any thing of it farther, than that the flax should be spread thin and evenly, and that it should be turned over, when about half roted; otherwise the under side will be more roted than the upper.

Flax that is harsh may be softened, in the manner directed for hemp. That which is roted too much may be restored to its strength, by keeping it a few years.

It is a very nice point to give flax the proper degree of roting. If roted too much, its strength is impaired for present use, and it wastes more in cleaning; and, if roted too little, a great addition of labor is requisite in fiting it for use. That which is coarse will rot quicker than that which is fine; these should, therefore, be kept separate while roting, in order that the latter have longer time for this purpose. The short and the long should also be sorted, as it is inconvenient to have them mixed, in dressing.

In some parts of Europe, the dressing of flax is a business carried on by itself, and water-machinery is generally used for the purpose. Many kinds of labor are accelerated by being divided into different branches; as it is found that those following a particular branch become more expert in it, and of course can perform the labor better, and at the same time cheaper.

The Farmer, perhaps, would do well to make more of a business of raising flax, when he becomes engaged in it, by raising enough in one season to last him two or three years: He would then have a greater inducement to go more spiritedly into the most approved method of cultivation, from the conviction, that cultivating it in the most complete manner, and pretty largely at a time, is the only way to make the business profitable.

Particular care should be taken to have the seed perfectly clean; and also, to sow it evenly. This is best effected by first sowing one-half of the seed over the whole ground, and then the other half, crosswise. It should be sown in a calm time.

FLOODING OF LANDS. Where swamp-land is to be cleared, and it can be flooded, by making a dam at the outlet, at a small expense, it is a matter of economy to attend to this, as in this way its growth of wood can be completely killed. This may also be performed on lands, after they are cleared, for the purpose of killing the grass, if it be bad, in order with more ease to introduce a better kind, or a better system of culture. Flooding also serves, in a greater or a less degree, to enrich the land; though this depends chiefly on the kind of water with which it is flooded. If it contain a rich sediment, it is good; but, if destitute of this, it is of no use.

See IMPROVEMENT OF LANDS.

FOALS, OR COLTS. To raise the best Colts, the first step is to procure the best Breeding-mares, then put them to the best Horses, and give the Colts good keeping, particularly during the first Winter after they are weaned. The proper time for weaning is the begining of foddering-time; and then they ought to be put in a stable by themselves, kept on good hay, and fed regularly twice a day, during Winter, with oats, or some other nourishing food. The next Summer, they ought to have good pasture.

Colts are frequently spoiled by poor keeping at the time they require the best; and this, as is the case with all other young animals, is during the first Winter. After this they do not require better keeping than is requisite for other Horses. If Colts be not well kept the first Winter, they are very apt to get stunted; and of this they never wholly recover. If Farmers would pay more attention to keeping their Colts in the best manner, as well as a due attention to the selection of Breeding-mares, and of Horses for covering, we should soon find the breed of Horses in our Country much improved.

FODDER AND FODDERING. Much chaff and straw, that is often thrown away, may with a little pains be made good fodder for cattle, by being mixed with green corn-stalks, or with hay not fully dried, and sprinkling a little salt throughout the whole. In this way the moisture and much of the sweetness of the stalks, or hay, is absorbed by the straw and chaff, and, with the addition of the salt, the whole mass is converted into good fodder. Cattle will also eat straw or chaff very well, after having some brine sprinkled over it.

Salting all fresh hay, when put up, is a great addition to it, as it renders it more nourishing to cattle, and of course will go further in keeping them. A respectable Farmer of this county *(Herkimer)* who keeps a large stock of cattle, says, he is certain, that adding eight quarts of salt to each ton of hay will make it go as far, as a ton and a quarter that has not been salted. At the same time, hay may be put into the mow, when salted, in a much greener state than without it; and when taken out will be found almost as green and apparently as fresh as when first stowed away.

Hay which is stored in narrow mows, or on scaffolds, will keep well with less drying than that which is put into large mows. To prevent hay from damaging in a large mow, some recommend a barrel or a stuffed sack to be placed in the centre, and gradually raised as the mow is raised: This forms an opening in the middle, through which the steam of the heated hay can pass off, and thereby prevent it from being mow-burnt. Another method is, to put the driest hay in the centre, and the wetest nearest the outsides.

See also, BARN.

Meadows which produce wild grass ought to be mowed very early, and the hay well salted down; and in this way cattle will eat it nearly as well as they will herdsgrass.

Stacking of hay in meadows, to be fed out there, is a poor plan; as the meadows are in this way often much injured by the treading of the cattle; and, when this is not the case, much hay is generally wasted, and the dung of the cattle turns to little or no account. The Farmer ought always to have sufficient room in his barn, and hayhouses, to hold all his hay; or, if he has not this, he ought to stack his hay adjoining his barn, and then it can be easily thrown in at once, when his barn is emptied.

Foddering should not be commenced till it is really necessary; for, when the cattle have been taught to expect it, they will neglect their other feeding. Fodder at first in the morning, when the frost is on the ground. Neat-cattle should not yet be housed; but Horses should. In cold rains they should, however, be sheltered, as these are more hurtful than cold dry weather.

The meanest fodder should not be dealt out first, but leave this for severer weather. If the stock of fodder is too scanty for the stock of cattle, don't pinch them in the forepart of the Winter: They can better endure scanty living, when they have become hardened to the rigors of the season.

Some Farmers feed their straw entirely to some of the hardiest of the young cattle; and for this purpose keep them by themselves, without suffering them to taste any other food, by which means they will keep tolerably well: But, perhaps, the better way is to lay aside the straw, when threshed, with some brine sprinkled over each layer, so as to give a degree of saltness to the whole mass; and, after it has lain a while, to occasionally feed it out to all the neat-cattle. This will answer in place of salting them, and at times they will eat this food with a good relish.

It should be remembered, that cattle ought not to be kept constantly on salted fodder; for in that case they grow tired of it: A change of food, sometimes salt, and sometimes fresh, is best.

Too much fodder should never be laid before cattle at once: Rather let them have a little at a time, and be fed the oftener. By constantly breathing on their food, it becomes less palatable; and for this reason they will eat that which has been exposed to the open air and winds, after they have rejected it in the stable.

Cattle which run out during Winter should have a shelter, and a rack under it to hold their fodder. By this mean, most of their dung, being droped under the shelter, will be preserved from the rains, and will, on that account, be much better than that which has been more exposed.

Cows, when near calving, should not be confined to their stalls; but each should have a separate apartment, and be kept without tying.

Horses keep well on clover-hay, mixed with herdsgrass. If they are to be fed with Indian corn, or other hard grain, it should be well soaked, boiled, or ground, before it is given them. They may be kept in good order by feeding them with raw potatoes or carrots, washed clean; though they would be more nourishing when boiled. Pumpkins are excelent for fating them.

See PUMPKIN.

FOLDING OF LAND. Folding Sheep on fields, which are ploughed up for fallow-land, is a very good practice;

as in this way the land receives all the manure that is made from their dung and urine, without the trouble of any previous preparation, or carting, &c. But folding Sheep on small pieces of ground, says Mr. *L'Hommedieu*, will do the Sheep as much injury as it will benefit the land.

The reason of this seems to be, that when Sheep lie on ground on which they have previously lain and dunged, for several nights, it becomes hurtful to them, for pretty much the same reasons that they are injured when too many of them are placed together in one pen during Winter: Their breath and the smell of their excrements are injurious to each other. But where they are folded in a larger field, they choose a fresh place to lie down every night, and in this way eventually go over the whole field.

It is said, that in this way an hundred Sheep will, in one season, sufficiently manure a fallow of eight acres for a good crop of wheat. The manure thus made should be frequently ploughed or harrowed under, to prevent much of its evaporation.

Folding Cows, &c. on land, can only be done to advantage on small pieces of ground designed for cabbages, turnips, &c.; for, if put into a large field, they will almost always lie down on nearly the same spot.

See MANURES, for an advantageous method of folding Cows, &c.

A low spot of grass-ground, which is inclined to bear coarse wild grass, will be much helped by folding Sheep on it; to the injury of the Sheep, however; and so will a dry spot, by folding Cows on it.

When ground is folded for raising turnips, instead of sowing this crop the first year, let it be frequently ploughed, in order to kill all the weeds, and sown early with flax the next Spring, and then with turnips, after the flax is taken off. Great crops of flax may in this manner be raised; and by again mellowing the ground, after the flax-crop, a very good crop of turnips may be raised the same season.

FOOD OF PLANTS. Every seed contains a plant in embryo: When it has acquired its full size and shape it is then a perfect plant. In the mean time, it derives, first from the seed itself, then from the air, the earth, and from water, certain food which nourishes it and causes it to grow to maturity.

From the air it is supposed to absorb hydrogene gas, and the septous principle, or azote; and for this reason will grow most thrifty in large cities, or in the vicinity of animal putridity. Let any putrid decaying flesh be laid in a field of growing plants, and those which are nearest to the putrid matter will grow much faster than those at a distance; because those nearest have a greater chance of absorbing the impure air emited from it, than those growing farther off.

See further, AIR.

From the earth, plants derive some of their component parts, as discovered by chemical analysis; such as earths, salts, oil, &c. and from water, whether mixed with the earth, or otherwise, they imbibe the juices or sap, which is so essential to their existence.

See SAP.

Some manures, it would seem, operate by attracting matter which is food for plants; such as gypsum, which is supposed to attract nitre and moisture. Ashes afford salts and attract nitre. Other manures again afford, in part, the food of plants, and at the same time assist them in obtaining more from the earth, by opening it for the more easy extension of their roots; such as barn-dung and manures of that kind. Others, perhaps, assist directly in supplying food; such as salts, blood, putrid flesh, &c. Others, again, merely serve to open earths which are too solid to admit the roots in search of food; such as sand, roten wood, sawdust, &c. applied to clays. And, lastly, clay applied to sand assists, in part, by supplying additional food, and partly by enabling the soil to retain a sufficiency of water to supply plants with the requisite proportion of this article.

Some plants extract their food principally from the air; some, mostly from air and water; and others, principally from the earth. The hyacinth, and many other plants, will grow well with air and water, without the assistance of earth. But, generally speaking, plants require the united assistance of air, water, and earth; and from these they extract that food which is requisite to bring them to perfection.

Some plants acquire most of one kind of food from the earth, and some another. Tap-rooted plants, again, derive their nourishment from a greater depth; while those with fibrous roots merely extract from the surface. Hence, the earth, as the common parent of plants, may become exhausted, in continually producing some kinds; while it may still be well fited for the production of others; and hence, in some instances, arises the necessity of a change of crops.

See CHANGE OF CROPS.

FOREST. Every farm ought to have a piece of woodland, or forest, sufficient for fuel and other purposes. Raising timber, for the purpose of fencing, will not often be found advisable. Farmers must eventually depend on making stone walls, or hedges, for the purpose of enclosing their lands. But wood and timber sufficient for fuel, for building, for carriages, and implements of farming, cannot be dispensed with. Of these, the Farmer will always find it most advantageous to keep the requisite stock himself, and not rely on others for purchasing it. Nor is it advisable to have his woodlands separate, and at a considerable distance from his farm; unless it be in parts of the country where part of the lands are too valuable to be kept in wood, and other adjacent parts are only fit for that purpose.

When the Farmer is clearing up his farm, he ought to reserve, for woodland, that part which is least adapted for tillage, or for grass. Land which is swampy with a thin soil over a sandy bottom; that is rocky and hilly; or that is dry, poor, or very gravelly, may do well for woodland; while it would answer but indifferently for tillage.

The quantity of ground to be set apart for this purpose must depend on the size of the farm; the quality of the soil of the woodland; the nature of the climate; and, frequently, according to the demand or market for wood; for, in some cases, it may be found more profitable to keep tolerably good land in wood, than in any other cultivation. Of the natural growth of wood, it will require as much as twenty acres, or more, to keep two fires, according to the common method of using wood for fuel; but it is a very easy matter to have siting-rooms warmed, and all the cooking and other apparatus of the kitchen so contrived, as not to require more than one-third of the wood that is commonly used.

See WARMING OF ROOMS.

To thicken a forest, or to prevent its becoming too thin, cattle should be kept out of it at all seasons. The seeds, or cutings of trees, of rapid growth, should also be set, or planted, in every part that becomes destitute of growing wood. If woodland be suffered to become so thin, that the sun can get in and cause the ground to be covered with a sward of grass, this will prevent the further growth of young timber; and in this way the ground eventually becomes striped of all its growth. This, however, is not the case with the locust, as it encourages the growth of grass amongst it, and in this situation grows very rapidly. Perhaps the Farmer will find, when he is reduced to the necessity of planting wood for fuel, that this tree will answer his purpose best.

See LOCUST.

The Lombardy-poplar also grows very rapidly, is easily raised from cutings, and, when cut and dried, will answer tolerably well for fuel.

The easiest method of raising the locust is as follows: Plant, in the first instance, about fifteen or twenty trees on an acre; when they have got to be twelve or fifteen feet high, and their roots well extended, run straggling furrows through the ground, and, wherever the roots are cut with the plough, new trees will start up, and soon stock the whole ground with a plentiful growth. This tree has been but lately introduced into general use in France; and it is said to be there valued more than any other which is cultivated in that Country.

Where wood is raised merely for fuel, it may be suffered to grow as thick as it will; it becomes sufficiently thined of itself, as it grows larger; but where oak, or any other trees, are to be raised for timber, they ought to stand further apart, in order to have their growth rapid, and the timber firm and durable.

If woods are old and decaying, the better way is to cut all off, as you want to use the wood, and let an entire new growth start up, which will grow more rapidly.

Much poor exhausted lands in this Country should be planted with forests, to supply the waste of wood that is constantly increasing. For raising oaks, which are an essential article, some direct to let the acorns be ploughed under, with a shoal furrow, in the Fall; or they may then be buried in a bed of earth, and, after they have sprouted in the Spring, planted as before, at the distance of about a foot from each other. They may also be planted in the sward, at the depth of about two inces, by diging little holes for the purpose.

See further, OAK.

Let the weeds be kept down till the young growth of the forest shall have overpowered them. The strongest plants will keep down the weakest, and thus sufficiently thin the trees, as they increase in size; but, where a growth for timber is intended, let the weakest be cut away to give more room for the strongest, after they have attained some considerable size. Let no cattle be admited into the forest, until the trees are beyond their reach; and, at no time whatever, where young sucessive growths for fuel is intended.

FOUNDERING OF HORSES. We usually say that a Horse is foundered, when his legs and feet have become stiffened and sore, by eating too large a quantity of hard grain at once. The best remedy for this, is exercise by riding; and in addition to this let the bits of his bridle be wound round with a rag, into which let as much human ordure be put as it will hold. Put this into his mouth, and let him chew upon it while riding him, and in due season repeat the dose, if necessary.

But there is a disorder of the feet of Horses, in which they are also said to be foundered. This is a painful disease: The Horse affected with it draws himself up in a heap, and is loth to move. It is occasioned by standing in cold water, after being heated with exercise; or, sometimes, even by standing still in the stable several days, after exercise; sometimes by bad shoeing, or by bruises on the legs.

In this case, if a remedy be not speedily applied, a gathering will take place in the feet, and the hoofs will be cast off; by which the use of the Horse will be lost for some time. The remedy is, to slit the hoofs open from top to bottom, so that blood will follow pretty freely. In order to cure these wounds again, apply tar, turpentine, and honey, melted together, with a fourth-part of the spirits of wine. Let pledgets made of tow be soaked in this, and then laid in the chinks, and the foot bound up. These are not to be opened for two days; and then let fresh applications be made every day, till the channels in the hoffs be grown up.

If the sole of the foot is also drawn, it must be served in a similar manner. A piece of leather should be laid over the sole, and the whole foot so bound up with strong bandages, that the applications may not be displaced.

FREEZING. Every hard stiff soil, when thrown up in ridges in the Fall, and mellowed by the frosts, receives thereby an essential addition to its fertility. A Winter's frost is not, however, always sufficient to mellow the largest clods; those should, therefore, be broken in pieces in the Fall, with the roller, in order to derive full benefit from the frosts.

A Farmer of Newjersey, some years since, trench-ploughed an exhausted field of clayey soil in the Fall; cross-ploughed a part of it, and in that part broke the lumps to pieces. In the Spring, the field was all ploughed equally, and sown with barley and clover. The part on which the most labor had thus been bestowed was in fine order when sown, and yielded about thirty bushels an acre, of barley: The other part was still in lumps, the frosts not having been found sufficient to mellow them entirely, and the product of barley was only about twenty bushels an acre. The same difference was afterwards observed in the clover.

But this field, with this stratum of crude earth thrown uppermost, would have yielded little or nothing the next Spring, and until mellowed and fertilized by Summer-suns, had it not been mellowed and fertilized by Winter-frosts.

Another benefit derived from freezing is, that it serves to restore all soils to a due state of sensibility to the operation of heat.

Heat is the stimulant of soils; but, as is the case with all stimulants, the longer it is applied without intermission, the less powerful it becomes; particularly in the production of grasses and other plants which are natural to northern climates. Thus, a degree of heat which in the Fall will not be found sufficient to make those plants grow, will make them grow rapidly, when applied to them in the Spring. In this respect, therefore, freezing, which is only the absence of heat, serves as a kind of restorative to the soil, and refits it for the production of those plants. Thus freezing is a fertilizer of stiff soils, and a restorer of all, by renewing their sensibility to the effects of heat.

When plants have been frostbiten, while growing, they may be restored by sprinkling them plentifully, while in the frozen state, with brine, or with water containing a solution of sal-ammoniac, which is better.

FRUIT-TREES. Mr. *Forsyth*'s essay on these has been justly esteemed, for its originality and research. It is, however, a production best calculated for the Country where it was writen; and even there, perhaps, some parts of it may be found more pleasant in theory than profitable in practice. His composition for curing defects in trees, and restoring old decayed ones, and the method of preparing it, shall be first noticed, and is as follows:

Take a bushel of fresh cowdung, half a bushel of lime-rubbish from the ceilings of old rooms, which is best (or pounded chalk, or old slaked lime, will answer) half a bushel of wood-ashes, and a sixteenth of river-sand; sift the three last articles fine, before they are mixed; work them well together by beating, &c. so as completely to mix them: Then reduce the mass to the consistence of thick paint, by mixing with it a sufficient quantity of urine and soapsuds, so that it can be used with a brush. A good coat of this is to be applied to the naked wood, where a limb is cut off, or the wood otherwise laid bare, and the powder of wood-ashes and burnt-bones is to be sprinkled over this, and gently pressed down with the hand. When any of the composition is left for future use, it is to be covered with urine, to preserve it from the atmosphere, which injures it.

With this composition, Mr. *Forsyth* restores old roten decayed trees to a flourishing state. In order to do this, all the roten and dead part of the tree is first cut away and scooped out, quite down into the roots, till you come to the live wood, and then smoothed, and the edges next the live bark rounded off. Then the composition is laid on with a brush, and covered, as before directed, with the powder. As the bark on the edges grows over this covered wood, it works off the composition and supplies its place, till at length the bark of the two edges meets and grows together. If the growing bark should raise up any flakes of the composition, so as to expose the wood, let them be pressed down with the finger some rainy day, when the composition is pliable.

Where a tree would be too much weakened, by cuting away all its dead wood at once, cut only a part away next the edges, and as the bark covers this cut away more. Where limbs are cut off, let the stumps be pared smooth and the edges rounded, before the composition is laid on. He says, this should always be applied wherever a limb is cut off, in order to preserve the tree from roting at such places.

He makes mention of many old decayed trees, some of whose trunks were roted away two-thirds, and half of the roots gone, which he restored to a sound flourishing state, by the process above described. It is, however, said, that some who have tried the experiment in this Country have not been successful; but, whether this may be ascribed to a want of skill in the performance, or a difference in climate, is perhaps not well ascertained. Perhaps the composition ought to varied in its materials, so as to be better adapted to the greater degree of heat and dryness which prevails in our atmosphere.

He also makes mention of shaving off all the cankery bark of old stunted trees, then scarifying the remaining bark, where they were bark-bound, and covering the whole with his composition, which produced a surprising alteration in their growth.

In lieu of the above composition, the following has been successfully used about Albany, for healing the wood, and for covering the stock in grafting: Take two parts of bees-wax, one of rosin, and one of hogslard; melt them, and blend them together. It must be made soft enough to put it on with the hand; and let it be laid on thickest round the edges and thinly in the middle. If it become too soft, during the heats of Summer, let a little powdered rosin be sprinkled over it.

Mr. *Forsyth*'s method of *heading down* trees, in order to renovate their growth, and to procure a new set of straight, thrifty, bearing limbs, is as follows: First, take off one or two of the principal limbs, just above an *eye;* let them be cut slanting downwards, with the sides where the eye is the highest; pare and round off the ends of the stumps, and cover them with the composition. Presently, sprouts will start out from the eyes, which are to be trained and pruned for new bearing-limbs. When these have grown a little, cut off more of the limbs, and go through the same process with them, and so on, till they are all taken off. Thus, a new set of thrifty limbs are given to the tree, which will be better bearers than the old. The new growths soon cover the stumps, so as to leave only a slight cicatrix.

He speaks of heading down some trees at once, and particularly recommends the heading down of all young trees while in the nursery, by taking of the whole trunk a little above the ground, and in the manner above directed, which he says will greatly improve their future growth, and make them better bearers. He mentions, particularly, some young oaks, he thus headed down, which afterwards grew more than as fast again as those which were not.

He also describes a method of pruning the limbs at their bearing ends. This is to take off the most prominent twig, when it has become *tired* of bearing, close to the next lateral branch; and then this shoots forward and becomes the bearer: When this has in like manner become tired of bearing, the limb is to be taken off, back at the next lateral branch; and the next shoots forward again, and so on.

This may be a good plan to keep trees in the dwarf-state, which is so much practised in Greatbritain; it being necessary there to raise much of their more tender fruit by the sides of walls, made very high for the purpose, round the fruit-gardens; and there, the keeping of some kinds of fruit-trees in the dwarf-state, is the more necessary.

Fruit-trees are subject to a disease, called the *canker*. It occasions the bark to grow rough and scaby, and turns the wood affected to a rusty-brown color. It will sometimes kill the tree, if not remedied in due season.

This disease may arise from various causes; from bad pruning; from dead shoots left on the tree; from frosts killing the last year's shoots, &c.

The diseased parts are to be entirely cut away, till nothing but sound *white* wood remains; or, if the disease be merely in the bark, the outer bark must be cut away; and if the inner bark be also affected, which is to be known by its exhibiting small black spots, like the dots of a pen; cut all away that is thus affected, and let the composition be applied, as before directed.

In the Memoirs of the Philadelphia Agricultural Society, we find mention of a disease of appletrees, called the *bitter rot*. Whether this is merely another name for the canker, we are unable to say. It is, however, cured by taking off all the bark of the body of the tree, and some little distance up the large limbs; when a new bark will presently form, and restore the tree. This operation is directed to be performed during the longest day in the year.

Fruit-trees, of the stone kind, are frequently diseased with *gum*, which arises from bad pruning, bruises, and other causes. The diseased parts are to be cut away, and the composition applied as before.

Thus much for Mr. *Forsyth*. Those who are anxious to be more intimately acquainted with this Author, will do well to purchase his book. In the plates annexed to it are exhibited many specimens of his ingenuity.

If fruit-trees be suffered to run much to suckers, these will greatly injure their bearing. Let them, therefore, be kept clear of these. All straight upright shoots from the limbs of trees, should also be taken away, for these bear no fruit; though in time their lateral branches will bear. Lateral branches are always the bearers; and such branches, as do not bear, only serve to rob the bearing branches of their requisite nourishment; and should therefore be taken away. The trees should also be cleared of all dead and decaying branches, and of all cross-branches that rub against each other.

Young apple and plumtrees, in particular, are apt to get covered with what are usually called *lice*, being an inanimate substance resembling an insect, of the color, and somewhat of the shape, of a grain of flaxseed, but narrower. Where the bark is thickly covered with these, the growth of the tree will be very much impeded; and sometimes it will be killed, if they are not removed. They are to be scraped off with a knife. Moss ought also to be scraped off, as it greatly injures the growth of the tree.

For keeping off moss, lice, and every thing else that should be kept off from young apple and some other fruit-trees, it is a good plan to whitewash their bodies, and principal limbs, every Spring, with a mixture of lime and water. Mr. *Forsyth*, however, recommends, for this purpose, a mixture of old urine, cowdung, and soapsuds. Where young fruit-trees stand in sward-ground, the sward should be cut away from about them, and the ground about their roots loosened every Spring.

It is found, that the seeds of the apple, and probably all other fruit-trees, which are brought from Europe, here, will grow larger than those of our own. Probably, this is merely the effect of a change of seed: If so, our seeds sown there might produce the same inequality. Be this as it may, it is by no means certain, that the largest fruit-trees are the most profitable to the acre; as, the larger they are, the more ground each must have.

See further, the articles which treat of the various kinds of fruit-trees.

FUEL. In the Northern States, fuel is an expensive article, not only to the Farmer, but to those who live in villages and towns. To the Farmer, however, this article is usually the most expensive; as, on account of his not duly estimating the real expense he incurs for fuel, he is in the habit of using it in profusion; generally consuming, together with what he suffers to be wasted, twice or three times the quantity really requisite for the use of a family.

A Farmer, with a farm of two hundred acres of land, generally leaves about fifty acres of it uncleared, principally for the purpose of supplying himself with fuel. This land, in the older settled parts of the Country, and where wood is becoming more scarce, would, on an average, command a price of, say, forty dollars an acre, or two thousand dollars for his fifty acres, the interest of which is one hundred and twenty dollars a year.

Then add about thirty-seven cents, as the expense, per load, of cuting and drawing home about one hundred and twenty loads a year, which amounts to upwards of forty-four dollars, and the Farmer will find he incurs an expense of more than one hundred and sixty dollars a year for his fuel; a sum which is about double what is usually expended by a family living in a village, and perhaps more than is usually expended, for this article, by a family living in our more large and opulent towns.

Under article, WARMING OF ROOMS, we have described some improvements in the means of warming one or more apartments, with the least expense; by which it is estimated, that as much as two-thirds of the usual expense, of fuel, for this purpose, may be saved.

And, under the article, STEAMBOILER, we have also pointed out the means of greatly lessening the expense of cooking, boiling, &c. by means of which an equal saving of fuel may be made. Thus enabling a Farmer, of the description just mentioned, to retrench his expenses, in fuel, more than one hundred dollars a year.

But, in addition to all this, great savings may be made, by adopting the best means for making woodlands yield the greatest possible quantity of wood, as well as of husbanding, to the best advantage, that which is growing.

The natural growths of forests are but seldom composed of those trees which grow most rapidly. Such as are most congenial to the soil, and climate, always cover the earth, in a state of Nature, whether their growths be rapid, or slow. At the same time, many trees of quick growth will thrive well in soils, and climates, very different from those where they were first found. Such is the case with the locust, buttonwood, Lombardy-poplar, willow, &c. &c.

Where, therefore, the ancient forests are becoming more thined, it will be found good husbandry to supply the deficiency, thus made, by the introduction of other growths; such as the locust, and Lombardy-poplar, for instance, on the drier soils, and buttonwood, willow, &c. &c. on those which are low and wet.

See further, FORESTS.

In husbanding any forest, or growth of trees, several things are to be observed. In the first place, the young trees, which are subject to be injured by cattle, should be protected. No cattle should be suffered to run in grounds covered with such growth; the cattle can acquire little or no food, but what is gained at the expense of the young trees; and, what is gained in this way, is greatly counterbalanced by the injury thus done to them.

In the next place, when trees are to be cut down for fuel, those should be selected for the purpose which are the least productive, or that grow the least in a year: And this point is to be ascertained, as well by the general appearance of the trees, whether they be healthy and sound, or otherwise, as by observing the yearly shoots of every tree; as the limbs of those which grow the fastest shoot the greatest length every year.

In thining the trees, some regard should also be had to their standing, as nearly equi-distant as is compatible with the circumstances just mentioned. In natural forests, too, those sorts of trees which naturally grow faster, than others of different kinds, should be left standing; provided they are thrifty, and of a kind that is valuable for fuel.

In felling the trees, they should be cut off as near the ground as possible, by which means less wood will be suffered to go to waste in the stump; and the small limbs should all be carried home, cut up, and laid under the woodhouse to dry; as a few of these, when dried, will often answer as well to boil a teakettle, or pot, as where larger wood, in greater quantities, is used for the purpose. All decayed and roting wood should also be brought home; for this, when dried under the woodhouse, will answer very well for fuel.

See WOODHOUSE.

Wood should always be dried, before it is used; for, although when dried it will not last quite so long, in burning, as when green; yet one-half of the quantity, at a time, will give more heat, and at the same time make a much pleasanter fire. There can be no doubt that, generally speaking, any given quantity of dry wood, while consuming, will impart any given degree of heat, for as much as one-fourth, and, with some kinds of wood, perhaps even two-thirds, of the time longer, than the same quantity of green wood: Of course, a proportionate saving may be made in the use of the former, in preference to the latter.

There is a saving in sawing wood, when carted home, in preference to choping it, as the sawing can be full as speedily and cheaply performed. A further saving is made, in cuting up the wood quite short; as a fire composed of billets of wood, not more than fourteen inches long, will give more than two-thirds as much heat, as that made of wood of double that length.

The size into which wood should be split, so as to be durable in burning, and yet give sufficient heat, is also a matter worthy of some consideration. If spilt very small, any given quantity will give more heat, for a while; but will be quickly consumed: If large, it will consume slowly; but will burn less readily, and give much less heat. On the whole, we are inclined to believe that billets, of from about three to four inches of a medium diameter, will be found the most economical, as avoiding the two extremes.

Wood, when dried, forms the best of all fuel, not only as making the pleasantest fire, but for all culinary purposes. Most kinds of coal, as well as peat, and turf, the only other articles of fuel generally used, are by no means so convenient, for many purposes, of cooking particularly; but, where either of these can be procured, at no great distance, they are generally a cheaper article of fuel, than wood.

Coal needs no previous preparation for use, but the mere diging it out of the earth. Peat, and turf, are easily raised, in the first instance, by means of a long narrow spade with a wing, set at right angles on the right side, by means of which a square chunk, about fourteen inches long, and four inches square, is cut out from the pit at every sinking of the spade.

But, in order to render these masses of earth fit for burning, some further steps are requisite: Each chunk, thus cut out, is to be laid on the ground, separate by itself, to dry; and, when partly dried, are to be piled, open, across each other; and thus, in a few days of dry weather, they will be fit to cart home for use. They should be kept under cover, in a dry state, for the purposes of fuel. These earths are very cheap kinds of fuel, where they can be had on any farm, or at no great distance from it.

See further, EARTHS.

Where neither of the foregoing articles are to be had, for fuel, recourse must be had to artificial means, for a supply. In some instances, dried cowdung has been used, for this purpose. But the best artificial substitute for fuel, that we can suggest, would be about equal parts of cowdung, or horsedung, and clay, well mixed together, and cast, like bricks, into chunks, say, three or four inches square, and about twelve inches long, and in that shape dried for burning.

Clay, of itself, will undergo a process of calcination, when dried (*See* Burnt Clay) and we believe that, with a suitable quantity of either horse or cowdung, mixed with it, and prepared in this way, it would answer tolerably well for fuel, particularly when burned in a grate, with a trifle of dry wood to set fire to the mass. Nor would this be any great waste of manure; as the ashes, thus made, or rather the burnt clay, would probably be nearly, or quite, as valuable, as a manure, as the dung which would thus be wasted.

We would, lastly, mention that, in the Domestic Encyclopedia, published by Dr. *Mease*, of Philadephia, a fuel is recommended, which is made of clay, with a suitable quantity either of common coal, or charcoal, ground fine, and mixed evenly with the mass; when it is shaped in suitable moulds, and dried for use.

We are induced to think favorably of this method of making fuel, as it is probable a small quantity of the last-mentioned coal is sufficient, and that no great quantity of the first is requisite; though this must depend on the quality of that material.

It is also said, that the shives of flax, or hemp, mixed with clay, and dried as before mentioned, make good fuel.

In the same Work, directions are also given for making *fuel-balls*, as they are there called, for the purpose of kindling fires, as follows: Take equal parts of coal and charcoal, ground fine; mix them with clay; form the mass into balls, about as large as hen's eggs; dip them in a strong solution of saltpetre, and then dry them; when they will be found quite inflammable.

FULLER'S THISTLE (*Dipsacus.*) The heads of these are used for raising the knap on fine woolen cloths. From their present scarcity, in our infant Manufactories, they command a great price; and are, therefore, worthy of attention.

Sow the seeds, at the rate of about a peck to the acre, about the first of May, on ground properly prepared by ploughing and harrowing. Keep down the weeds by hoeing, and let the plants stand about a foot asunder: All the rest are to be cut away. Hoe them as often as the weeds rise. The heads do not form until the second Summer. When they are fit to cut, which will be about the first of August, let them then be cut, tied in bundles, and dried, under cover, or in the open air, according to the state of the weather.

The heads have sold, in our Woolen Factories, for a cent a piece; and sometimes double that price. An acre, at this rate, would amount to several hundred dollars.

G.

GARDENS. These are distinguished into the flower-garden, the fruit-garden, and the kitchen-garden. We shall say nothing of the flower-garden; for farming has nothing to do with flowers; but the fruit and kitchen-gardens are somewhat more substantial.

It is best to have the fruit and kitchen-gardens in the same enclosure; but the plan, too often observed, of blending them together, in too great a degree, ought to be avoided. Fruit-trees, which make considerable shade, must be injurious to the growth of vegetables in the same neighborhood; and ought therefore to be cultivated by themselves. Such fruit-trees, however, which make but little shade, as grapes, currants, quinces, &c. may be very agreeably intermixed with the growths of the kitchen-garden.

For the Fruit-garden, *see* FRUIT-TREES, PEACH, APRICOT, QUINCE, &c. &c.

A kitchen-garden, well stored with vegetables, is highly important to the Farmer, as the use of these supersede the necessity of consuming much meat; a practice equally inconsistent with economy and with good health. When we perceive that the food of the Cottagers, of Ireland, is principally milk and potatoes; that these are a race of People which are healthy, robust, well-made, with strong, quick, and ardent powers of mind; and when we perceive that those savage nations which, for want of other food, are obliged to subsist entirely on fish or other meat, are generally the most stupid, squalid, and ill-made; we certainly cannot draw conclusions in favor of eating great quantities of flesh.

It is advisable to have a close high fence round your kitchen and fruit-gardens. This, in the first place, renders every thing within it secure from Pillagers; and also serves to keep out fowls. Another, benefit consists in keeping off the strong cold winds of the Spring, which are very injurious to the young plants, and also to the fruit, which is then about puting forth.

Dung that is old, and destitute of the seeds of weeds, ought only to be used in manuring a kitchen-garden, and the ground ought not to be ploughed, but deeply dug, for all vegetables which root deeply in the ground. Nothing further need be said, with regard to the kitchen-garden, than that a loose mellow soil, with a southerly exposure, is the best; that it ought to be kept rich; that, as fast as weeds rise, they ought to be extirpated; and that no weeds ought to be suffered to go to seed within the garden.

If the garden be of a wetish or stiff soil, it will be greatly benefited by being thrown up into high ridges in the Fall: At the same time, this will assist in destroying the seeds of weeds; but particularly in destroying insects which may be breeding in the soil.

GARGET. *See* NEAT-CATTLE.

GIGS. Little tumors, or bladders, filled with matter, found in the mouths of Horses. The cure is effected by sliting them open, and then washing them with salt and vinegar.

GLANDERS. Commonly called the *Horse-distemper*. It is always accompanied with a discharge of matter from the nostrils, and a swelling of the glands under the throat and tongue. When the bones in that part become carious, it is generally incurable; and this may be known by the bad smell which is produced in such cases. The treatment recommended in *Gibson's* Farriery, for this disease, while in its first and second stages, is to make use of purges, diaphoretics, and roweling in the hinder parts. We imagine, that roweling in the breast will answer the same purpose. *See* ROWELING.

To clear the nostrils, *Gibson* recommends passing the fumes of burnt brimstone, or burnt leather, into the nose of the Horse, and, after the matter has been discharged, to syringe his nostrils with brandy or red wine. Afterwards, he says, a small quantity of *Unquentum Egyptianum*, dissolved in oil of turpentine, may be injected through a large pipe, for the purpose of cleansing the ulcerated parts.

GOATS. These animals are hardy, and rather more prolific than Sheep. The Kids are apt to poison themselves by eating the evergreen shrub, called laurel (*laurus*) if they can find it. These are excelent for the table; and even the old ones are tolerably good eating, and are generally well filled with tallow. The milk of the Goat, of which they give a greater quantity than any other animal of their size, is good to mix with that of Cows, in making cheese. It is also much esteemed in consumptive cases. Their skins are much more valuable than those of Sheep, being nearly as strong as that of the Deer.

Goats are very useful on new farms, as they serve effectually to destroy all sprouts and bushes. They are peculiarly excelent in destroying shrub-oak bushes, as these are naturally hard to subdue.

GOOSE. *See* POULTRY.

GOOSEBERRY (*Ribes Grossularia.*) This species of the currant requires about the same soil and culture, that is required for the common red or white currant.

See CURRANT.

A very good wine may be made from the gooseberry, and varieties may be produced of this plant, by sowing the seeds in the same manner as is mentioned of currants.

Mr. *Forsyth* observes, that by mixing up a rich soil to plant those in that have been raised from seed, and by watering and thining the fruit, they have grown much larger than any ever before seen in England. He further observes, that great attention should be paid to the early and late sorts; that, where they run up to long naked stems, they should be *cut down*, which will make them throw out good bearing shoots; and, in that case, his composition must be applied. There are other observations made by Mr. *Forsyth*, on the culture of this plant, which are here omited, as not being considered of any material consequence.

GRAFTING. Mr. *Forsyth* describes several methods of grafting:

As, first. *Grafting in the rind*, which is proper only for large trees.

Secondly. *Cleft-grafting*, which answers well on small stocks or limbs, and has been mostly practised in this Country.

Thirdly. *Whip-grafting*, or *tongue-grafting*, which is also proper for small stocks only; and, as *Forsyth* says, is the most effectual of any, and the most in use in Great-britain.

Fourthly. *Inarching*, or *grafting by approach*. This is done where the stock to be grafted on, and the tree from which the graft is taken, stand so near together that they may be joined.

Forsyth says, that grafts, or scions, should be cut off from the trees before the buds begin to swell; that they should be laid with the cut end downwards, and buried half their length in earth, having the tops covered with litter, to prevent their drying too much; that they should be all of the growth of the former year; that they should always be taken from healthy, fruitful trees; for, if taken from sickly ones, the grafts often partake of the distemper; that, if taken from young luxuriant trees, they may produce luxuriant shoots; but will not be so productive, as those taken from fruitful trees; that those which are taken from lateral, or horizontal, branches are to be prefered to those of the strong perpendicular shoots; and that none should be taken from the sprouts of trees.

Mr. *Forsyth* prefers the *whip-grafting*, for common cases; but, for these, Mr. *Deane* prefers the *cleft-grafting*. This, he says, is most commonly practised in this Country, and is attended with success. It is done on the stocks in the nursery, or on the small limbs of trees. The proper season for it is just before the leaves begin to open. The head of the stock must be cut off sloping, and a slit made sloping the opposite way, deep enough to receive the scion, which should be cut like a wedge, with the outside thicker than the inner. The rind of the scion must exactly join the rind of the stock. The slit should be opened by a wedge of hard wood; the scion should then be gently put in its place and the stock closed. After this, the whole must be daubed round closely with a mortar made of a mixture of loam and fresh horsedung, so as completely to exclude the access of air; and this mortar must be surrounded with a winding of tow, or old cloths, to prevent the rains washing it away. The scion should be covered nearly to the top with this mortar; and it should also extend two or three inches downwards round the stock.

In place of this mortar, *Forsyth* recommends a plaister made of pitch, turpentine, and beeswax, which is in like manner to be daubed closely round, so as to exclude the external air. The mortar, however, if well made, and well applied, will answer very well. It should be composed of fine loam, not clay; because clay will contract and crack open, when dried.

Cleft-grafting may be successfully performed on trees, where the fibre of the outer bark runs round; such as the peach, plum, cherry, &c. by first cuting through that bark, with a knife, at the place where the cleft is to be made, and in the same direction it may be expected to run; when the rest of the operation may be as easily performed as on other trees.

Whip-grafting is performed by cuting off the head of the stock sloping; then making a notch in the slope, from the upper part downward, a little more than half an inch deep, to receive the scion, which must be cut with a slope upward, and a slit made in this like a tongue, which is to be inserted into a slit made in the slope of the stock; and the scion is then set in, so that the rinds of each join exactly together. The scion is then fastened by a ligature to keep it steady, and then surrounded with mortar, or the plaister, as before.

Grafting in the rind is performed by cuting off the stock square; sliting down the bark a small distance, and raising it up, so that the end of the scion may be inserted between it and the wood: The scion is made with a shoulder, cut in about half its thickness, and the other half is sloped off gradually, so as to give it the form of a wedge; the cut-side being flat and the bark-side untouched. This wedge or tongue is inserted under the bark, with the shoulder fited to the stock; the raised bark is then pressed close and bound round, and the plaister is applied, as before mentioned. It is usual, in this case, to insert three or four scions in one stock.

Mr. *Preston*, of Pennsylvania, says he has grafted scions which came from Holland, which were apparently dried, and they grew; but that he failed in other instances, where the bark of the scions appeared to have become somewhat roten. He was also successful in grafting scions of the appletree, as late as the twentieth of June, when the leaves of the trees were full grown.

See further, INARCHING and INNOCULATING, for the methods of performing these operations.

GRAINHOUSE, OR GRANARY. If the Farmer thinks proper to build a grainhouse, which is very useful for Indian corn in particular, the best method of keeping rats and mice out of it is, to set it on blocks, covered with flat stones, large enough to project four or five inches beyond the blocks, on every side. To prevent the blocks from roting at the bottoms, they ought to be set on stones, raised a little above ground. It is a good plan to have a grainhouse and carriage or wagonhouse built together; the upper part for Indian corn, and other grain, and the lower part for wagons, carts, ploughs, &c. &c.

Some Farmers make provision for a place to keep their Indian corn in their barns, which is a pretty good plan. The place for this is a floor, raised on a second set of beams, which rest on posts set in the beams, next below the plates of the barn. In the middle of this floor is a hole, through which a tackle is suspended, and the corn is raised in baskets and spread a proper thickness over the floor. Such a floor in an ordinary-sized barn would probably contain three hundred bushels. At the proper season, the corn is thrown down on the barn-floor, and there threshed out with flails, or with a threshing-machine, which is better, and is then cleaned and put into bins made for the purpose on one side of the barn-floor.

See BARN.

The bins must be made tight, of hard plank, sufficiently thick to prevent the rats from gnawing through them; and the lid to each may be fastened down by a clasp secured by a padlock. This plan is equally good for keeping wheat and other grain. If the grain which is put into these should heat, it can be shoveled out upon the floor, and there stired about until it is sufficiently dry to be returned into the bins. The method of ascertaining, whether grain has become heated in the bin, is to run a stick to the bottom; let it remain there for a quarter of an hour; and in that time, if there be any heat in the grain, it will be communicated to the stick.

If grain be kept long in sacks, its heating may be prevented by frequently turning them, first on one end, and then on the other.

GRASSES. Some of these are best calculated for moist or wet soils, some for dry, and some for the different climates in which grass is cultivated. Some again are best for pastures, and some for mowing. The different kinds which are most valuable are here noted, together with their proper soils, &c.

MEADOW-CATSTAIL, *Timothy-grass* or *Herdsgrass (Phléum Pratensis)* is the grass most used for hay in the Northern States. It is also erroneously called *Foxtail;* but this is another grass. The catstail has a long head, somewhat resembling the tail of a cat, with very fine seeds; the foxtail has a short bushy head, more like the tail of a fox, with coarser seeds. In other respects, they have considerable resemblance.

Catstail grows best in a rich *moist* soil; but it will grow well, for a few years, in a rich *wet* or in a rich *arable* soil. In the rich wet soil, it gradually lessens in product; while, at the same time, it gives way to wild grasses. In the rich arable soil, it gradually fails, by reason of the ground becoming bound and the sward thickened with other grasses. Probably, if it were well torn with the harrow every Spring, and not too closely pastured in the Fall, and none in the Spring, it would grow well for many years in such soil. By close pasturing in the Fall, it is apt to be torn out by the roots, and by croping it again in the Spring, it suffers greatly.

It will yield one-half more hay, when not pastured at all, than when pastured closely in the Fall, and again in the Spring. In the richest soils, and when not pastured, upwards of four tons may be had from the acre, in a season, at two mowings. Cattle are not quite so fond of it in pastures, as they are of clover; but, when made into hay, they eat it very readily. It is not so much a fertilizer of land as clover: On the contrary, it binds, and somewhat exhausts, the soil. It is perennial, and will last beyond the memory of Man, if not destroyed by close pasturing. The proper time for mowing it is, when it is in blossom, or a little later.

From the trials made in Greatbritain, of this native American grass, it is however asserted, by Mr *Curtis*, to possess no excelence which is not possessed, in an equal degree, by the

Meadow-foxtail (*Alopecurus Pratensis.*) This grass is much cultivated in Greatbritain. It is an early grass, and vegetates with such luxuriancy, that, according to Mr. *Curtis*, it may be mowed three times a year. The British Graziers consider it as one of their best grasses, particularly for larger cattle. The soil best suited for it is moist meadow-land, or that which is occasionally overflowed; though it will grow well on almost any soil, except those which are very wet, or very dry. *Linnæus* states it to be a proper grass for grounds which have been drained.

It is perennial, and yields abundance of seed, which is easily gathered. The seed is, however, sometimes liable to be destroyed by an insect.

Meadow-fescue (*Festuca Pratensis*) is an early, hardy, perennial grass, and grows well on almost every soil; good for hay or pasture; produces abundance of seed, which is easily gathered. Mr. *Curtis* says, it has a great resemblance to raygrass; but is superior to it for forming meadows, as it grows longer and has more foliage. It blos-about the middle of June.

Darnel, *or* Raygrass (*Lolium Perenne*) is good for an early supply of pasture, as it starts very early. It grows to the height of about two feet, and blossoms the latter end of May. Horses are extremely fond of it, when made early into hay; and for Racehorses, particularly, has been found preferable to any other hay. It is, however, apt to run too much to stalks, in most soils; and then cattle dislike it in pastures. A natural sort of raygrass is mentioned, as having been lately cultivated in Greatbritain, which is much superior to the sort usually cultivated there.

See further, *Quitchgrass*, in Weeds.

Crested Dogstail (*Cynosurus Cristatus*) is good for upland pastures, and is a wholesome food for Sheep. It forms a thick turf, and blossoms about the middle of June. It abounds with seed, which is easily gathered; but care should be taken, that it be fully ripe, as otherwise it will sometimes fail to grow. It is suitable for dry, sandy soils, and will not thrive in wet meadows.

Meadowgrass *(Poa Pratensis)* will flourish well even in the driest soils, and will endure drought better, perhaps, than almost any other grass. It makes fine hay, and is fit for early cuting. It is also good for early pasture. It yields plenty of seed; but this is difficult to sow, on account of their filaments causing them to adhere to each other. To remedy this, it is recommended to put them in newly slacked lime, to separate them, and then to be rubed in dry sand.

Vernal or **Springgrass** *(Anthox Anthum Odoratum)* is a very early grass for pasture, and grows in almost every situation; though not equally productive in each. It is an ordoriferous grass, and is recommended by some to be sowed with other grasses, in the proportion of about one-eighth for meadows. It is not very productive.

Meadow Softgrass *(Holcus Lanatus)* grows well on any soil, not too dry and barren. It is best calculated for Sheep in pastures. It is injurious to Horses, when made into hay, by producing a profuse discharge of urine, and general weakness; which may, however, be readily removed by a change of food. It is not a very early grass.

Sheeps-fescue *(Festuca Ovina)* grows well in dry, sandy soils, is very good for Sheep, as they are fond of it, and soon fatened with it. It is perennial, and flowers in June.

Hard-fescue *(Festuca Duricuscula)* flourishes in almost every situation, wet or dry, and blossoms in June. It grows luxuriantly at first, often to the height of four feet; but it soon becomes thin, and disappears after a while. It is best for mixing with some other grasses.

Annual Meadowgrass *(Poa Annua)* is in flower throughout the Summer. Cattle of every kind are fond of it. It is recommended for Milch-cows, on account of its affording butter of a very superior quality.

Roughstalked Meadowgrass *(Poa Trivialis)* resembles the preceding in its appearance, and in flowering; but is best suited for moist or wet meadows. It is very productive, and good for pasture or hay. It is, however, liable to be injured, says Mr. *Curtis*, by severe clod, or excessive drought.

Fowl Meadowgrass *(Poa Avaria, Spicalis Subbifloris)* was first discovered in a meadow, in Dedham, and was supposed to have been brought there by water-fowls, says Mr. *Deane*. It is an excelent grass for wet meadows, and has been known to yield three tons of hay to an acre, in a season. It remains so long green, that it may be mowed at any time from July till October. It makes very good hay for Horses, and Neat-cattle particularly.

FLATSTALKED MEADOWGRASS *(Poa Compressa)* flourishes in dry soils, and flowers from June to August. Dr. *Anderson* esteems this as the most valuable of all the *Poas*. It forms a fine turf, and imparts a delicate flavor to the flesh of Sheep and Deer, which animals are very fond of it.

SILVER HAIRGRASS *(Aira Caryophyllea)* is most suitable for sandy lands, and is recommended by Mr. *Stillingfleet* for Sheep-walks, on account of the fineness of the mutton of those Sheep which are fed on it. It flowers in July. Mr. *Stillingfleet* applies the same remark to the waved mountain hairgrass *(aira flexuosa)* which grows in heaths and barren pastures, and is in flower from June to August.

BENTGRASS *(Agrostis Stolonifera.)* This grass, which is commonly called the *Fiorin*, is a native of this Country, as well as of others. It grows abundantly in that part of Ireland which is contiguous to the Giant's Causeway; and also round Logh Neagh.

Mr. *Green* says it grows in great profusion in the island below the city of Albany. By chemical experiments, it is found more nourishing than any grass known.

In the Orcheston meadow, in England, it has yielded nine tons to the acre, in a season. Its bulk, when growing, does not seem greater than that of some other grasses; but it is uncommonly heavy.

Sheep and Neat-cattle are very fond of it. When given to the Cows, it increases the quantity, and improves the quality, of their milk. It grows as well in the shade as elsewhere, and may be grown either from the seeds, or from the strings or runers of the grass; and from these latter it is most readily cultivated, as they will take root, at each joint, with a slight covering, after they appear to be perfectly lifeless.

The method commonly practised, in Ireland, for rearing it, is to cut the strings in short pieces, strew them evenly over the ground, and cover them with suitable earth, or with compost, as the nature of the ground may require: After which they are to be kept clear of weeds, until such time as the young growth has got a sufficient hold of the soil; when it will cover the ground thickly, to the exclusion of every other grass or weed.

Mr. *Peters*, of Pennsylvania, is successfully cultivating this grass, and from his communications we derive most of our information respecting it. By his trials of it, the dry uplands of this Country are not well calculated for its growth.

It delights in a moist or wet soil; thrives well even on wet boggy lands, and covers them with so tough a sward, that teams may readily go on them. It is also well suited to lands which can be irrigated, or to such as can be overflowed.

It is not a fit grass to be connected with any alternate husbandry; as, after it has goten complete footing in a suitable soil, it is hardly to be eradicated. This we, however, conceive to be no objection to its culture, in all lands to which it is properly adapted; for, if more of these be found on any farm, than may be thought expedient to be cultivated with it for mowing-grounds, it will be found equally profitable for pastures.

It is longer in coming to maturity, than other grasses; and, for this reason, is mowed in the Fall, in Ireland. Here, it would probably be fit for the sithe in August. It is more troublesome to mow than other grasses. When dried, it is first put into very small cocks, and afterwards into larger ones; but in these it must not be tramped down; and in this situation may remain exposed to the weather for months, without essential injury. Its small bulk, in proportion to its weight, renders it much less expensive to keep under cover, than the hay made of other grasses.

It would seem, there are several varieties of this grass; and, probably, that cultivated in Greatbritain is superior, in product, to any found here. Mr. *Peters* says, the strings of the fiorin found here are not so large as those brought from Ireland. In his last communication on the subject, it appears that the product of his hay, of this grass, was at the rate of four and a half tons per acre; but this is on dry upland.

Mr. *Clifford* had, for the first cuting, on upland in his garden, at the rate of three and a half tons to the acre.

For the greater quantity of nutriment contained in fiorin, than any other grass, *see* NUTRIMENT OF FOOD.

We are, on the whole, fully of opinion, that a great acquisition to the wealth of this Country will be found in the extensive culture of the fiorin, where lands are best adapted to it.

GUINEAGRASS (*Panicum Maximum.*) This grass was first brought from Guinea, into the island of Jamaica, and is highly extoled by Mr. *Edwards*, in his History of the Westindies.

We will give the Reader the account which Mr. *Oglesby*, of Kentucky, gives of its product in Wilkinson county, in the State of Mississippi; and from this, and from the certificates of others, it will be seen, that it must become productive of immense advantage to the southern part of our territory, and perhaps to every part of our Country.

'I have (says Mr. *Oglesby*) been accustomed to both timothy and clover meadows, and have frequently assisted in cuting some of the best in the State of Kentucky. At Percyfield, near Fortadams, I cultivated a lot of Guineagrass, somewhat less than a quarter of an acre; from which I fed six or eight Horses, during the Summer of eighteen hundred and twelve. I planted it in the second week in May, and began to cut it the 20th of June, and cut it five times before the 15th of October, and obtained from each plant (which occupied a square yard) about sixty pounds of green grass.

'I have frequently observed it to grow four inches in twenty-four hours. From the astonishing growth, and from the result of all my experiments, I have no hesitation in saying, that it will yield ten times as much as any timothy or clover meadow I have ever seen. It is now (15th October) as green as it was in June; and animals are remarkably fond of it, both green and dry. The hay is excelent, and cures without difficulty.'

Mr. *Bronaugh* says it will produce more than six times the quantity of any other grass he ever knew. Mr. *Robinson* says, 'on the 16th July, 1812, I weighed the first cuting of one plant of Guineagrass, which was thirty pounds.' The certificate of Mr. *Green* is of similar import. Dr. *Brown*, of Natches, who furnishes the certificates, corroborates them, and considers this grass of immense importance to the Country.

We can see no reason why it cannot be cultivated in every part of this Country to advantage; notwithstanding it must be planted yearly, it being killed by the frosts. In countries where frosts do not prevail, it is perenniel. Dr. *Brown* says it is best adapted to a rich moist soil; but will grow to advantage on any.

TALL OATGRASS (*Avena Elatior*) flowers in June and July. It grows very large and coarse, and makes a pretty good hay; though Horses are not fond of it. In point of excelence, Mr. *Curtis* ranks it next to foxtail. In pastures, it should be closely fed. It yields plentifully of seed. No doubt, a little salt applied to the hay made of this grass, when laid down in the mow, would be a great improvement to it. It is also called *Orchardgrass*.

Mr. *Muhlenberg*, of Pennsylvania, recommends this grass very highly, as one of the best he had cultivated. It would probably answer well for soiling, as it starts very early and grows very late.

YELLOW OATGRASS (*Avena Flavescens*) is also a coarse grass, which thrives in meadows and pastures, and on hills of calcareous soil, where it flowers in June and July. Though tolerably sweet, it is less relished by cattle than the *poas* and *fescue* grasses; though Mr. *Curtis* says, it promises to make good Sheep-pastures.

Yarrow *(Achillea Millefolium)* is highly recommended by Dr. *Anderson*, as being one of the most valuable plants growing in Greatbritain. It thrives well on moist loams, and on the driest soils, and will be found green when other grasses are parched with drought. Every kind of cattle are fond of it. The seeds are gathered in October. It flowers in June and July.

It is a mistake, however, to rank this plant among grasses; and its superiority has never been discovered in this Country.

Ribgrass *(Plantago Lancolata)* has been considerably propagated in Yorkshire (Greatbritain) where it is held in estimation. It is best adapted to rich sands and loams, and on poor sands it answers tolerably well for Sheep. It is not liked by Horses, and is bad for hay, on account of its retaining its sap. It is said, by Barron *Haller*, that the richness of the milk, in the celebrated dairies of the Alps, is owing to the Cows feeding on this plant and the lady's mantle *(alchemilla vulgaris)* Its seed is plentiful.

Cocksfoot *(Dactylis Glomerata)* is a coarse grass, and grows with luxuriance. It suits all kinds of soils, but those which are very wet or very dry. It is recommended by Mr. *Pacey*, who says it affords an abundant crop; springs early; yields abundance of seed; makes excelent hay; and is very permanent. It flowers in June. Where it grows on rank soils, however, or in coarse patches, cattle will not eat it.

Blue Dogstail-grass *(Cynosurus Coerulius)* is the earliest of all the British grasses, and flowers a fortnight sooner than any other. It is, however, not very productive; but may be useful in Sheep-pastures, in high rocky situations, where there is but little soil.

Of Aquatic Plants, which are useful in Cultivation, are the following:

Flote-foxtail *(Alopacurus Geniculatus)* grows in meadows on the Severn, where other good grasses are expeled by reason of wetness and inundations. It is a good grass for hay, and flowers in May and June. It is recommended for newly-reclaimed morasses, and lands recovered from the sea.

Flote-fescue *(Festuca Fluitans)* will grow in still weter grounds than the *flote-foxtail*; or, rather, may be said to be amphibious, growing as well in the water as otherwise. It flowers in June, and is a constituent part of the celebrated Orcheston meadow, in Greatbritain. Horses and Cows are very fond of it. It springs early, and promises to be useful for the same purposes as the last-mentioned grass.

The Chedder and Cottenham cheese owe their excelence principally to this grass, and to the

WATER-HAIRGRASS (*Aira Aquatica*) which is further said to contribute much to the fine flavor of the Cambridge butter. It generally grows in the edges of standing waters, and flowers in June and July.

REED MEADWOGRASS (*Poa Aquatica*) is one of the largest and most useful of the British grasses, and forms much of the riches of Cambridgeshire and other counties in England, where draining meadows, by wind-machinery, is carried on. It is good for pasture and hay, particularly for Milch-cows, though it is not relished well by Horses. It is strong and well-suited to low places, which are liable to be inundated. It grows to the height of six feet; but should be mowed when about four feet high. It may be mowed several times in a season.

It grows plentifully in the marshes of Sandusky-bay, River Raisin, Detroit, and elsewhere, round the westerly part of Lake Erie, where it is the principal reliance for pasture and hay. The French Farmers there cut it, and bind it in bundles, when dried, which seems to be similar to the management of it in the parts where it is cultivated in Greatbritain.

In addition to the Natural Grasses here enumerated, as worthy of culture, are several Artificial Grasses, or Vegetables which are cultivated as such; among the most valuable of which are the following:

LUCERNE (*Medicago Sativa.*) This grass was introduced from France into Greatbritain, about sixty years since, and is very highly esteemed for *soiling;* though it makes good hay, if cut while quite green.

Mr. *Livingston* has made considerable trials of it in this State, and the products have, in some instances, been greater than those mentioned by British Writers. With the best cultivation and plentiful manuring, from six to nine tons of hay, per acre may be had in a season, of this grass. Twenty pounds of seed are requisite for an acre, if sown in the broad-cast; or six pounds, if drilled. If cultivated in the latter way, it is to be ploughed and hand-hoed three or four times in the season; but perhaps the broadcast is the more profitable culture here, where labor is high.

Mr. *Young* recommends it to be sown with oats; first sowing and harrowing in that grain, and then sowing or drilling in the lucerne, and covering it lightly with a light harrow. Others, however, advise, that the ground be previously well prepared by deep, frequent, and effectual ploughings, and that the seed be sown by itself; and, as it is essential that the ground be well seeded, perhaps this is the better way.

Mr. *Livingston* sowed it in the fore part of September. after a crop of early potatoes, and found it to answer very well. If the ground be prepared for it by Summer-fallowing, it may be sowed at this time. The essential points in preparing the ground are, first, to manure it well, and then to have it frequently and deeply ploughed, and well cleared of the seeds of weeds.

A dry loam, sandy or gravelly loam, rich sand, or other good dry soil is suitable for it. It is said to grow well in the coldest climates; but those which are mild are most suitable for it. It is a very early grass, endures drought well, and grows very late. Probably our dry warm Summers are more favorable to its growth, than the cool moist ones of Greatbritain; and that, for this reason, greater crops of it may be raised here. Where ground has been well prepared for a crop of flax, this grass might be sowed to advantage immediately after that crop.

See FLAX.

During the first season of its growth, the product will not be so large as afterwards: In this season, too, when cultivated in the broadcast, it is most infested with weeds, which are most easily destroyed by frequent mowings, for the purpose of soiling. The mowings may be as often as the grass will fill the sithe. During this season, too, it will be much hurt by being pastured; but, after this, it may be fed without injury.

Sometimes this grass becomes diseased and turns yellow: In such case, let it be mowed immediately, and it will then start as fresh and green as ever.

Mr. *De La Bigarre* says, that, after this grass has stood two or three seasons, it should be well harrowed early in the Spring; and if the roots are considerably torn, by the operation, they will not be injured. This should be repeated every second Spring afterwards; and at these times the ground should previously have a good top-dressing, which will be well mixed with the soil in the operation of harrowing. The dressing should not be of barn-dung, but some manure, or compost, free of the seeds of weeds. Bog-dirt, bog-marle, mud, &c. are good for this purpose. Let gypsum also be applied every Spring; but not before the harrowing, as this manure should never be buried in the soil.

Mr. *Young*, of Greatbritain, makes a computation of his expenses in cultivating an acre of this grass, in the drill-way; and, after deducting the expenses and rent of the ground, tythe, and rates, he makes the clear profit 9*l.* 18*s.* 4*d.* sterling.

Mr. *Livingston* has also made a similar computation, of some cultivated by him in the broad-cast; the result of which was not very far different; though the value of the crop was, in this case, set much lower than that put upon it by the former Gentleman.

This grass lasts about ten years; when the ground should be ploughed up; and it will then be found very rich, as the crops do not materially exhaust the soil.

It is believed that, for soiling, in particular, this grass will be found more productive and profitable than any other, where the highest cultivation and a suitable soil are given to it, and where the climate is suitable to its growth.

Mr. *Young* says, that, for fating Bullocks, and for pasturing Swine, this grass may be very advantageously used. Where it is made into hay, let it be cut while quite green, and made without much shaking about, as the leaves fall off considerably, when dry. A little salt added to it, when laid down in the mow, would no doubt be a great improvement.

Saintfoin *(Hedysarum Onybrychis)* will grow very well on dry stony soils, that are unfit for any good cultivation, and will produce on the worst lands a ton of hay, beside considerable after-math, in the season. On good dry lands, the product will be much larger. It may be used for soiling, during the fore-part of the season, and mowed for hay in the latter part. The hay will faten Horses considerably, as is said, without the aid of oats. It increases the quantity of the milk, and some say of the cream also; while the butter is improved in its color and flavor.

Saintfoin requires a soil free of the seeds of weeds, as for lucerne, and the ground should be well mellowed by deep ploughings. The seed may be sown with the drill, or in the broad-cast; three bushels being allowed to the acre in the former method, and at least four in the latter. The seeds should be *fresh*, and sown early in the Spring. Those which have a bright husk, a plump kernal, which is bluish or gray, without and greenish within, are the best. It is believed to be the better method to sow from one to three bushels of this seed, with about five pounds of common red-clover, to the acre; as the clover serves to keep down the weeds till the saintfoin has become well rooted. The seeds may be sown with oats or barley.

During the first season of its growth, no cattle should feed on it; nor should Sheep, during the second season. At the end of six or seven years, and afterwards, the ground should have such top-dressings and harrowings as are directed for lucerne; and let gypsum be also applied, every other Spring.

If the first season for mowing prove wet, let the crop be left for seed. It is at no time to be cut before it is in full bloom.

Burnet (*Poterium Sanguisorba*) is mostly used for early Sheep-feeding; though it may be advantageously used for soiling cattle; as it is hardy, is little affected by drought or frosts, and will even vegetate in moderate Winter-weather. If reserved for hay, it must be cut early, or it will become too coarse. It requires a dry soil, and may be sown with the drill, or broad-cast. It is essential to have good seed; for which purpose, a proper spot for raising it should be selected.

When a crop is designed for seed, let the ground be fed till sometime in May; otherwise the gras will be too rank for seed. These should be gathered while moist with dew, and threshed out in the barn, as soon as they can be dried there. They may be sown any time before August, after the ground has been well prepared. The following season, the crop is to be kept clear of weeds by the harrow, and, after that, it will grow so strongly as to keep down all other growths.

Cichory (*Cichorium Intibus*) commonly called Wild-succory, has been but lately cultivated; but on poor blowing sands, and weak dry soils, Mr. *Young* thinks it superior to any other plant; and that, if sown with burnet and cocks-foot, it will form a layer, for six or seven years, far exceeding those made of trefoil, raygrass, and white-clover. It grows more luxuriantly than burnet, lucerne, or saint-foin, and may be often cut, for soiling, during the Summer; twice during the first season, and three or four times afterwards, or every second month till October. It may be made into hay, which is coarse, but tolerably nourishing: Its principal use, however, is for soiling and for Sheep-feeding, as it is less injured by close feeding than most other vegetables.

Mr. *Young* advises it to be drilled at the distance of nine inches, on poor lands, or twelve, where the soil is richer, after the soil has been first duly mellowed. In this case, it will be greatly improved by an occasional scarifying. It may also be sown with oats in the broad-cast; but, for soiling, it is best sown alone in the fore-part of the season, and lightly harrowed in. It produces plenty of seed, which is easily gathered.

Spurry (*Spurgula Arvensis*) has been considerably cultivated in Flanders, on account of its growing very late in the Fall, and even during Winter, and affording good food for Sheep and Cows. Cattle are very fond of it. It flowers from July to September, and is best suited to sandy and other dry soils.

The Bush-vetch (*Vicia Sepium*) is said to shoot earlier in Spring than any other artificial grass. It grows late in Autumn, and, in Greatbritain, retains its verdure through the Winter.

Mr. *Swayne* states the amount of its produce, per acre, to have been about twenty-four and an half tons of green fodder, equal to about four and an half tons of dry hay.

The culture of this plant was long since recommended by *Anderson;* but the principal difficulty seems to be in collecting the seeds, as the pods burst when ripe, and thus scatter them before they can be conveniently gathered.

Dr. *Withering* also observes, that the seeds are often destroyed by the *larvae* of a species of *catelabus*.

Tares (*Vicia Sativa.*) Of these there are two varieties, the *Winter* and *Spring* Tares. Mr. *Livingston* made some trials of the latter, which were not very successful.

The Spring-tare is to be sown as early in the Spring as the ground can be well prepared, and the Winter-tare early in September; each at the rate of about eight or ten pecks to the acre, broad-cast, or about half that proportion for the drill. Each kind is good for feeding cattle of every description, particularly the Winter-tare, which, in Greatbritain, comes into use just as the turnip-crop is exhausted. This plant is not proper for making into hay, being greatly injured by wet weather, and requiring more than common pains to dry it. The seeds of the different kinds must be carefully kept apart, as they cannot be distinguished from each other.

The Broadleaved-vetch, *or* Everlasting Tare (*Lathyrus Latifolius*) was long since recommended by Dr. *Anderson*, as promising to afford large crops of hay and grass. It is eaten eagerly by cattle, and often grows to the height of twelve feet.

The Tufted-vetch, *or* Tare (*Vicia Eracca*) attains considerable height, and produces abundance of leaves. This sort and the *wood-vetch* (*vicia sylvatica*) which rises from two to four feet high, are said to restore weak or starved cattle, sooner than any other vegetable known.

The Strangle-vetch (*Lathyroides.*) has been strongly recommended by Mr. *Amos*, as affording a tender and agreeable food for Sheep.

Of Clovers, *the most valuable kinds which are known and cultivated, are the*

Trefoil, *or* Common Red-clover (*Trifolium Pratense*) which is commonly cultivated in this State. It grows well on all dry soils. About ten or twelve pounds of seed are requisite for an acre. It is sown in this Country with barley, oats, or Spring-wheat, when that article is raised; or it may be sown with Winter-wheat in the Fall, if the land be dry and warmly exposed; or in the Spring, when it should be lightly brushed or harrowed in.

The product of this grass, when well manured, may be four tons to an acre, at two mowings. It is peculiarly excelent for forming a lay for a crop of wheat; which may be sown to great advantage on the clover-sward, when properly turned under. All kinds of cattle feed and thrive well on it, either in pastures, when soiled on it, or when fed on the hay. For feeding Swine with the hay, however, it should be well saved, early cut, and steamboiled before it is given them, and in this way it will keep them in good condition through Winter.

See SWINE.

RED PERENNIAL-CLOVER, *or* COWGRASS (*Trifolium Medium*) is cultivated in Greatbritain, in almost every kind of good upland soil, even in heavy clay-lands. It is to be sowed in the Spring with oats, barley, &c. It is also usual to sow it there, as well as the common red-clover, with the crop of flax. It rarely succeeds when sown by itself. It produces abundance of seeds, which are easily collected.

HOP-CLOVER (*Trifolium Procumbens*) grows naturally in Greatbritain, in dry meadows and pastures. It is recommended by Mr. *Amos* for laying down land to grass, by mixing it with the clover last mentioned, and the

WHITE-CLOVER (*Trifolium Repens.*) This grass grows spontaneously on dry uplands in this State, after they have been manured with gypsum, or with bog-marle, &c. It is a very sweet grass for pasture or hay; but not very productive. It is generally short-lived; but may be made to last longer, by passing a roller over it; for, where the stalks come in close contact with the ground, new roots will start and descend into it. It is cultivated in Greatbritain for Sheep-pastures and for other uses. It is most useful in mixing with other grasses, for the purpose of thickening the growth at the bottom, and thus increasing the product.

After having said thus much of each particular kind of grass, something remains to be said of them in general.

It may firstly be observed, that in laying down lands to grass, of every kind, the work should be done effectually. The ground should be made mellow and fine; the seed should be clean and good, and sowed evenly and plentifully, and lightly covered, and the ground made perfectly smooth, particularly where it is intended for mowing or soiling.

The Graziers of Greatbritain, in laying down their grass-lands, make use of much more seed than is usual in this Country. Whether they use more than is profitable, experiments alone are competent to determine. Let one rod square of ground, properly prepared, be laid down with a given quantity of seed; another square rod with a greater quantity, and another with a still greater; then carefully gather and weigh the product of each square rod separately; and if that which has most seed has an increase of product sufficient to pay for the extra seed, and about thirty per cent more, that quantity of seed may be most advisable to give the ground.

In the same way, it may be ascertained, how far it is profitable to sow the ground with different kinds of grasses, in order to increase the product of the whole. This is a matter that is much attended to in Greatbritain, as will be seen by the following directions of Mr. *Young* and Mr. *Tollet*, for laying down particular soils to grass. Thus; Mr. *Young* directs for an acre of clay-land, the following grasses and proportions of each:

Of Cowgrass, five pounds; trefoil (common red clover) five do.; dogstail, 10 do.; and of fescue and foxtail, one bushel.

For an acre of loam, of white clover, five pounds; dogstail, ten do.; ray, one peck; fescue, three do.; foxtail, three do.; and of yarrow, two do.

For an acre of sand, of white-clover, seven pounds; trefoil, five do.; burnet, six do.; ray, one peck; and yarrow, one bushel.

Mr. *Tollet* directs, that, for an acre of such dry light soil as is adapted to the culture of turnips, the following proportions of seeds be given.

Of smoothstalked poa or meadowgrass, six quarts; raygrass, four do.; dogstail, six do.; yellow oatgrass, four do.; cocksfoot, two do.; vernalgrass, one do.; Cowgrass, three do.; white-clover, two do.; ribgrass, two do.; and of yarrow, two do.

Again, for such soil as is of the moister kind of upland, he allows, for an acre, of foxtail, six quarts; roughstalked poa, six do.; meadow-fescue, six do.; smoothstalked poa, four do.; raygrass, two do.; vernalgrass, one do.; Cowgrass, three do.; white-clover, two do.; ribgrass, two do.; and of yarrow, two do.

For firm low lands, liable to be overflowed, he allows of foxtail, 2 pecks; meadow-fescue, two do.; roughstalked poa, two do.; raygrass, one do.; vernalgrass, one quart; white-clover, two do.; Cowgrass, two do.; and of ribgrass, two do.

Where the water lies longer, he directs the composition to be as follows:

Of roughstalked poa, two pecks; foxtail, two do.; meadow-fescue, two do.; flote-foxtail, three quarts; and of flote-fescue, four do. And, for situations still more wet, the following: Of roughstalked poa, two pecks; foxtail, two do.; flote foxtail, one do.; and of flote-fescue, one do.

The above are given merely as specimens of the quantities of seeds advised to be apportioned to different soils, and of the several kinds which are deemed most suitable to each, in Greatbritain. Our Summers being warmer, and our atmosphere less moist, it does not follow, that the same sorts of grasses, or the same proportions and quantities of the seeds of each, would here be found most proper in similar soils. These are matters that are proper subjects of inquiry with the ingenious and experimental Farmer. Generally speaking, it is believed, that the British Farmers and Graziers give their grounds more seed than will be found necessary in this Country, whatever may be the case in Greatbritain.

GRAVEL. *See* EARTHS.

GREEN-DRESSING. Turning under a growth of green vegetables, for the purpose of manuring the soil. Buckwheat is much used for this purpose. Sow it in May, about half a bushel to the acre; and, when in blossom, run a roller over it, exactly in the way that it is to be ploughed under. After it has been all turned under, let it lie about twenty days, or a month, by which time it will be roten, and fit to be ploughed again to receive the grain intended to be sown. To increase the growth of the buckwheat, and of course the quantity of manure, let a little gypsum be strewed over the ground, if it be suitable to that manure. Even to wet buckwheat, intended to be sown, and then strew on it as much gypsum as will adhere to the grains, will make the growth of it considerably larger.

A green-dressing may be useful to a crop of wheat, where the land is Summer-fallowed, and at the same time is in poor heart. Lands, however, which are suitable for gypsum, are most easily recruited by the free use of that manure and red-clover; but, where the soil is not asssisted by that manure, or where it cannot be procured on reasonable terms, green-dressings may be found a useful part of husbandry.

GREENS. Potherbs, proper for boiling when young and tender, for food in the Spring.

Spinage, sown in the Fall, affords a plentiful supply of these: So will the common turnips, French turnips, kale, &c. But the Farmer ought to supply himself, in addition to these, with at least one good bed of asparagus.

See that article.

The plant which is commonly called pokeweed *(phytolacca)* is a very fine green, when it first starts up in the Spring, and until it gets to be about a foot in height. It might be well to keep a small patch of ground sown with it, as, after it has once got into the ground, it will start up every Spring from the roots. The same may be said of the tops of the plant which is commonly called milkweed *(asclepias)* which are also very fine.

See MILKWEED.

The *caltha palustris*, or marsh-marygold, growing abundantly in marshy places, makes an excelent green in the Spring of the year.

GREEN SCOURING. A disease to which Sheep and Bullocks are often subject. It is cured by verjuice: A Wineglass-full, for a Sheep; a pint, for a Bullock. Verjuice is the juice of the English crapapple. Our crabapple is of a different kind. The juice, however, of sour unripe apples, of the common kinds, may answer in place of verjuice.

GRIPES. A disorder, of the cholic kind, with which Horses and sometimes horned cattle are troubled. It generally proceeds from wind pent up in the stomach or bowels, and is caused by a high state of costiveness. Horses and horned cattle have been known to have the dung within them so hard and dry, that it could not be voided without assistance; and this assistance is by clearing it out by hand. After it has in this way been principally cleared out, clysters are to be administered, which will open the passage and of course give vent to the wind.

See further, NEAT-CATTLE, for the particular treatment of the disorder in them.

GROVES. These are both ornamental and useful. To plant heights of ground, the sides and tops of which are generally not very good for tillage or pasture, adds much to the beauty of a landscape; and is at the same time, highly useful, as it regards the quantities of firewood which may be produced from such spots. Planting rows of trees along highways is also pleasant for shade to the Traveler, and profitable to the Owner of the soil. The same may be observed, in regard to lanes, and to passages from the highway to the mansionhouse. Sugarmaple-trees, planted round the borders of meadows, and some straggling ones in them, are very pleasant and profitable, as they do no injury to the growth of the grass. Wherever trees can be planted in pastures and along fences, without doing injury to the growths of the adjoining fields by their shade, this part of rural economy ought never to be omited.

The shade of some kinds of trees is much more hurtful to the growth of plants than others.

'I planted maize (says Mr. *Livingston*) on the west side of a young wood, consisting of oaks, poplars, a few chesnuts, and a large mulberry somewhat advanced into the field. The shade made by the rising sun extended nearly across the field, and was not entirely off until about ten o'clock. I remarked that, as far as the shade of the chesnut reached, the corn was extremely injured; it was yellow and small. The chonical shape of the morning-shade from particular trees might be traced a considerable extent, in the sickly appearance of the plants. The blackoaks were likewise injurious; but less so than the chesnuts; the poplars, very little so. Near the mulberrytree, the corn was covered by its shade for a long time every morning; and, though not so large as that which had more sun, maintained a healthy appearance.'

The shade of the blackoak is particularly hurtful to the growth of wheat; that of the locust is, on the contrary, beneficial to grass-grounds; and that of the sugarmaple does but little injury to the growth of grain, and none to grass.

GUINEA-CORN (*Holcus Spicatus.*) This plant is considerably cultivated in South-carolina, where it is esteemed for its seed when ripe, which commonly yields from sixty to eighty bushels to an acre; and the growth is mowed while green, for the purpose of soiling cattle; for which it is very good, and abundant in its product.

The seed is used for feeding poultry, &c. and when hulled, which is there performed by beating in a mortar, it is nearly or quite as palatable as rice, when boiled and eaten with milk.

The crop is sown in drills. It does not exhaust the soil, if cut while green, and if the stubble be then ploughed under it rather assists the ground. It requires a rich dry soil.

GYPSUM. *See* MANURES.

H.

HARROWS AND HARROWING. In regard to shape, the three-square harrow is as good as any; but let it be long and narrow, for stoney or stumpy grounds, and wider where the ground is smooth. The essentials for a good harrow are, to have long heavy teeth, made of iron, and pointed with steel at the ends. Where the land is rough, there ought to be fewer teeth than where it is smooth. The teeth of the harrow, for rough ground, ought to be set slanting a little backward, so that it will not get fastened on the stones, roots, or stumps; and, on the contrary, where it is used for smooth ground, they ought to be set slanting considerably forward.

In stoney rough grounds, harrowing cannot be performed to so much advantage, as on smooth grounds; and every Farmer ought to make his grounds smooth: Two or three good harrowings may be as good as a ploughing. Harrowing ought to be performed, on wet ground, in a dry time, and in the middle of the day. On dry lands, it is best to harrow in the mornings, while the dew is on, and when the ground is moderately dry. It ought to be harrowed before seeds are sown; otherwise they will be buried of unequal depths and will come up in rows; most of the seeds being in that case thrown into the bottoms of the furrows.

On furrows of green sward turned under, the harrow must be loaded with more than its common weight, which in all cases ought to be pretty heavy, and run lengthways with the furrows. Where seed is sown on ridges, the harrow ought also to be run lengthways. Perhaps, in such cases, it is best to let the land remain in the furrows, as it is left by the plough; the seed, in such cases, being usually ploughed in.

Harrowing meadow-lands, where they become bound, or where they become cold and mossy, is of essential service to them, and will make them produce much more largely the following years. The best time to do this is in the Spring, while the ground is soft. If the meadow be too wet, however, for Spring-harrowing, it ought to be done in the drier part of the Fall; and, in such case, if a dressing of Horse or Sheep-dung, mixed with sand, be laid on, previous to the harrowing, it will be of essential service.

Harrowing wheat and rye in the Spring is considered, by European Writers, to be very beneficial; but doubtless this ought to be done very carefully; and it is advised, by some, that a roller be afterwards passed over the ground, to fix the plants which may have been disturbed by this process.

See also, SPIKY-ROLLER.

HARVESTING. In addition to the wheat and rye-harvest, in this Country, we have the Indian corn harvest.

A general rule, as it regards wheat and rye, is, that the earlier each is harvested, and before the grain has become hard, the whiter will be the flour, and the thiner the skin of the grain; but the whole weight of the product will be a little less, than if the grain be harvested later. Probably all that is gained by late harvesting is an addition to the skin of the grain.

When a severe blight or rust has struck wheat or rye, it should be cut immediately, even if the grain be in the milky state; and it should lie on the ground, but not so close as to injure the heads, until such time as the stalks have become dry and the grain somewhat hardened. Then it ought to be bound up and put in shooks, and carted in as soon as it is sufficiently dry. The later wheat and rye are cut, however, the easier it will thresh; but, at the same time, there is greater waste by the shelling of the grain, in harvesting and carting it in.

As soon as Indian corn is ripe, it should be harvested; but, while the stalks have any greenness, the crop cannot be said to be fully ripe. If the corn is merely toped in the field, not all cut up by the roots, while green, it is advisable to gather the ears, cart them home, and husk them out by night; by which means time is saved, and by which, also, the husks may be saved, which are very valuable for fodder for Cows, &c.

If Indian corn be killed by a frost, it should be immediately cut up by the roots, before the leaves have had time to wither, and set up in shooks, having the tops tied together to keep out the rains. In this way the ears will ripen, in the same manner as when left to ripen on the stalk. This, in most cases, is a good practice, where no frost has injured the crop; as in this way the field is cleared of the corn in time to plough and sow with wheat, and at the same time all the leaves and stalks are saved for fodder. By this method, also, the ground is less exhausted by the crop.

HAWS OR HOOKS. This is an enlargement of the membrane over the eye of a Horse, and is caused by fever; and fever, as Mr. *Peters* observes, is often occasioned by too high feeding and pampering this animal, as he had experienced, by the inattention of his Servant in this particular.

On his Horses being thus affected, the Servant was for applying the usual remedy of cuting out the haws; which Mr. *Peters* would not suffer to be done, as Horses are often deprived of sight by the operation. He found an effectual and speedy remedy for the disease, by feeding the Horses entirely on raw potatoes.

HAYMAKING. If a meadow is to be mowed twice in a season, the first crop ought to be cut earlier than where mowed but once, in order that the roots may recover immediately and be ready for vegetation afresh. Where the grass is cut later, the vegetation of the roots stops for some time. The grass, however, which is thus cut early will not be so heavy as that which is cut later, as it will shrink after cuting; but the roots will not be so much exhausted, and will afford a larger crop the next time of cuting, or the next Summer, if cut but once in a season.

The best time for cuting herdsgrass, where but one crop is cut in the season, is when the seeds of the grass have formed, but before they have become fully ripe; but, as Farmers cannot cut all their hay in a day or two, it is necessary they should begin before this time, that they may not end too long after it. The same time is also proper for cuting clover; or rather when a part of the heads begin to turn brown. Fowlmeadow or birdgrass, may be cut much later, without being hurt by long standing. We have seen wiregrass mowed on the clay-lands of Coxackie, in the month of October, for the first time in the season, and it then made tolerably good hay. Lucerne, on the contrary, must be cut while entirely green; otherwise it will make but poor hay. The same may be observed of all wild swamp-grasses, and of the high coarse grasses which grow every where on the vast prairies, that extend through the western parts of the territory of the United States.

For haymaking, it is essential to have dry weather; and the prospect for this ought always to be an object of attention with the Farmer. Frequently, the change and full of the moon produces an alteration of the weather, either for the better or the worse; but there is no certainty in this. As a general rule, the weather between the change and the full may be expected to be the best. Sometimes rainy spells of weather last for weeks, during hay-time; and during such spells it is sometimes as well for the Farmer to let his grass stand untouched, until the indications of the weather become more favorable.

See WEATHER.

Some methods are recommended for making hay, which are more tedious and more expensive than the common method, and, on that account, so much the worse, if in other respects they are better. But, where labor is scarce, time is every thing, in 'making hay while the sun shines,' and that method, in which it can be made with most expedition, ought to be prefered.

The best plan, therefore, is, for the Farmer to be at his mowing betimes in the morning; cut down as much as possible by nine or ten o'clock, by which time the dew will be off; then spread the mowed grass evenly, and about twelve turn it over where it lies thick; in the afternoon rake it into winrows, shake it up lightly, that it may be better exposed to the air; towards sundown make it into neat small cocks, and let it remain so a day or two. If it be not then sufficiently dry, shake it out again on a small space of ground, and turn it over till it is dried; then cock it again, if necessary, and as soon afterwards, as possible, draw it in.

But, in order to save much trouble in drying hay, the application of from four to eight quarts of salt to the ton is recommended: It is found that hay, thus salted, can be well saved in a much greener state, and at the same time the benefit which the hay derives from the salt is more than fourfold its value.

The method, also, of having a hole in the middle of large mows, may be found well worth attention, on account of its obviating the necessity of so much labor in drying hay, that is to be stowed away in such mows.

See BARN.

General *Smith*, of Suffolk, makes use of a *horserake*, for raking on his smooth mowing-grounds, which, with one Man, a Horse, and a Boy to ride the Horse, will gather hay as fast as six Men in the ordinary way. The rake is about ten feet long; the teeth about two feet; and at right angles from these are some upright slats of the same length, set, at the lower end, into the piece into which the teeth are morticed, and into another light slender piece at the top.

The teeth, when in operation, run along the ground nearly horizontally, with the points a little the lowest, so as to run under the hay, and as they take it up the upright slats retain it till the rake is full, when the Man who follows it behind turns it over, and thus empties it in a row; then lifts its over the hay, thus emptied, and sets it in beyond it; and so it proceeds on, till it is again filled, and the same process is again repeated.

When one strip across the piece is thus raked up, the Horse is turned round, and another strip is raked in the same manner, emptying the hay at the ends of the last heaps raked up, so that in this way winrows are formed.

When it is thus raked into winrows, it is draged up by the rake into bundles, large enough for making into cocks.

Those who make use of smooth ploughing-lands for mowing-grounds, or have smooth meadows, will do well to attend to this labor-saving implement.

HEDGES. For making these, different sorts of trees have been used, and the hedges have been made in different ways. Some have prefered planting the hedge on the top of a bank, thrown up for the purpose; while the more modern method is, to plant it on the surface, without any bank. This latter method is the cheapest, and, as is observed by Mr. *Pickering*, of Massachusetts, would seem to be the only proper method, in some hilly situations; as in such the ditch, to be made for raising the bank, may form a channel for carrying off much water, and thus become liable to be cut into a deep gully, to the ultimate ruin of the hedge.

In level lands, however, a hedge set on a bank, properly made, would seem to be most formidable to cattle; but the bank we should prefer would be one raised between two small ditches, and made in the manner described under FENCES. A bank of this description, after having served the purpose of a fence, with the aid of the additions there described, may, in the mean time, have the young hedge coming to sufficient maturity; when the additions, first made for completing the fence, may be taken away.

We have, at the same time, no doubt that a good hedge may eventually be made, in dry level lands, without the aid of a bank; but in wet or meadow-lands, which are not natural to the growths of upland timber, we should advise to have a bank sufficiently raised to lay the ground dry; unless willow, or some other growth suitable to a wet soil, is to be used for making the hedge.

We have seen the Washington-thorn (*crataegus cordata*) planted in Maryland, without any bank, on uplands; some of which were sufficiently dry, and some were naturally wet; and the result, as far as our observations extended, went to show that thorn, of that species at least, requires a bed of moderately dry earth; and that it does not flourish in wet soils.

This remark is here made, from a belief that thorn, adapted to the climate, is one of the most valuable trees for making hedges; that every species of this tree requires a soil laid sufficiently dry, if it be not naturally so; and that it should not be deficient of a considerable degree of fertility, either natural or acquired.

Where hedges are to be made of this tree, without being set in a bank, we should advise to the method pursued by Mr. *Quincy*, of Massachusetts, which is, first, to cultivate the ground, intended for bearing the hedge, with potatoes; having it properly manured, and kept clear of weeds; as this, or some similar preparative, is calculated to form a bed of the most promising nature for the future growth of the thorn, when set out; and also, for forming a sward of grass on each side of the hedge, when such should be formed.

The sward should not approach the young trees too closely at first; but a small strip, in which the trees stand, should be kept clear of grass and weeds, in order to accelerate the growth of the trees; and, where this part lies much exposed to be washed by heavy rains, it should be covered with small stones, or otherwise, until such time as the sward may immediately surround the young growth, without its thereby receiving essential injury.

The advantage to be derived from keeping young trees, of this or any other description, free from grass and weeds, about the roots, is to enable them to start with more vigor at first; for, after their advance in growth has become more established, by the wider extension of the roots, their future growth will not be so much impeded by the incumbrances of weeds or grass, which at first may prove so troublesome.

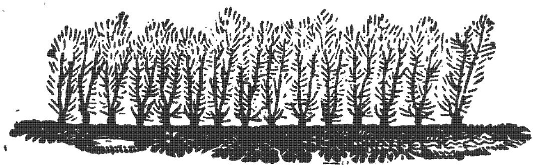
When the plants of thorn are about two feet high, they should be set out in a single row, on the bank, or on the surface, as the case may be, at the distance of about eight inches apart, and beded in good mould.

Mr. *Miller* directs that, before transplanting, they should be cut off at the height of about eight inches from the ground; and that, after having had a years growth, they should be headed down, similar to the manner directed by Mr. *Forsyth.*

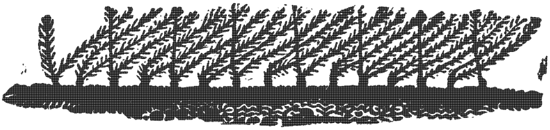
See FRUIT-TREES.

Which operation will produce a stronger and thicker growth. A sufficient number of sprouts from this growth are to be trained up; and when they get to about the height of six or seven feet, or less where they grow on a bank, the tops are to be cut down to an uniform height, and the trees to be trimed, and then plashed.

Before these operations, we will say the young trees exhibit an appearance something like the following:



And when trimed, and plashed, they will stand somewhat after this manner:



In the plashed state, as thus exhibited, the young trees, after having been headed down, as before mentioned, are supposed to send out at least two sprouts from each tree, which number, and no more, are to be trained up, the rest being cut away. Of the shoots thus trained, every fourth one is to be left standing erect, and the others are to be bent downward, as above exhibited, and wove alternately on each side of the upright shoots, in the manner of weaving threads in making common cloth.

Perhaps it might be as well to bend down every other shoot, and weave them among those left upright, in the manner just mentioned. It would seem that the shoots thus bent down would, in most instances, require to be tied to the upright shoots, where they cross these, in order that the former might more readily be confined till they become enured to grow in that position.

For the method of raising thorn, *see* THORN.

Such, or something similar, we conceive to be an outline of making a hedge of thorn, in the most perfect manner; a work commonly easier imagined than executed; not from any particular difficulty in performing the mechanical part of the operation; but, from what too often happens, the failure of having the young growths exactly as you would wish them to stand and flourish.

The failure of one or two trees in a place produces a chasm in the fence; and this at first is only to be obviated by some temporary method of filling up the gap; as it must at least require time to make any after-growth supply the place of trees which may be missing.

With all the imperfections, however, to which hedges may be liable, we consider them a much safer protection to the growing crop, and, generally speaking, less expensive, than the wooden fences which at present are commonly made in this Country.

Instead of plashing the hedge, a substitute is recommended by Mr. *Main*, of Georgetown, which he has found effectual. This is to cut or trim the top of the hedge down to an even height, of about three and a half, or four feet, and then to lay thereon light durable poles, tied together at the ends; and presently the new shoots will start up on each side of the poles, and thus hold them to their places; while each tree forming the hedge being, in this manner, mutually braced by the poles, the young hedge soon becomes enabled to withstand the attempt of any creature to push its way through.

The method of filling up any place, where there may be a deficiency in a growing hedge of thorn, as directed by Dr. *Mease*, is to scrape away the ground at such place, and if any roots of the growing trees are there to be found, cut them off, at the places where you want the trees to stand; and from the ends of the roots thus severed sprouts will start up, which are to be protected and cultivated in the places where they grow.

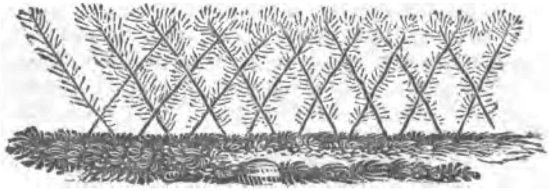
If no roots are to be found at the places where they are wanted, take pieces of the roots of the growing thorn, cut to the length of about five inches, and set these well into the ground, with the thickest end uppermost, at the places where the trees are wanted; and from these upper ends sprouts will rise and form a new growth.

The Palmetto Royal (*Yucca Aloefolia*) is said to make the best hedge that is known; but it will not endure the severity of the Winters of the more northerly States. It is well adapted to the more southerly part of this Country.

Mr. *Kirk*, of Pennsylvania, particularly recommends his method of making hedges. He makes them of the common Locust.

See Locust.

He merely makes a furrow, with the plough run once or twice each way, to serve as the bed for the young trees. These are to be of two years growth when set out in the furrow; they are to stand at the distance of about eleven inches from each other, and they are to be set leaning, or slanting, alternately in opposite directions, in order to be plashed or wove together, and tied in that position; so that, when the planting and plashing is completed, the young hedge will exhibit the following appearance:



In four or five years, Mr. *Kirk* says, the young hedge, when thus made, will form a sufficient fence; and as the shade of locust is not injurious to the growth of the adjoining grain, and is even beneficial to that of grass, the hedge may be suffered to grow up as high as it will.

In about thirty years after planting, it will reach the full meridian of its growth; when the whole may be cut down, at the height of about five feet from the ground, and then the stumps, thus left, will stand and serve as an impenetrable fence for as much as fifteen years more; giving about forty years as the length of time which that growth of locust will serve the purpose of a fence.

Mr. *Kirk* says that, on cuting the locust down, a new growth of sprouts will start up in abundance; from which sufficient may be selected for training up a new hedge, to supply the place of the stumps when they shall have failed.

If the foregoing may be safely estimated, as the result to be expected from the culture of locust, for hedges, we should be disposed to place this tree in the first rank, as well for making hedges as for other useful purposes. It forms a timber of the first rate for every use, where hardness, durability, and strength are required: It is also rapid in its growth, and excelent for fuel.

We should be disposed to say that a farm of common size, with locust cultivated for its hedges, would afford, from the growth of these, a sufficiency of fuel for such farm, if managed in an economical way.

See FUEL, and WARMING OF ROOMS.

Beside timber for most of the necessary purposes for carrying on the business of the farm.

The method pursued by Mr. *Kirk*, for making the seeds of the locust germinate, is to put them in water, hot enough to scald a Hog, and to let them remain in this till the water is cooled; when they are to be immediately planted, in a bed well prepared for the purpose, in rows or drills, at the distance of about eighteen inches between each drill.

The young plants are to be hoed, and kept clear of weeds, till the end of the second year, and in the Spring of the third they are to be set out in the hedge. The planting of the seeds, and the above-mentioned previous preparation for the purpose, is to be at the time when garden-seeds are usually commited to the ground in the Spring. While growing in the rows or drills they should stand four or five inches apart.

Mr. *Taylor*, of Caroline, Virginia, makes his hedges of cedar; and he says that, in seven years, a hedge made of this tree becomes as close, from bottom to top, as box, of a breadth not exceeding four feet; and that it is more likely to prove effectual against Hogs, than any of the family of shrubs, as it unites great density with the exuberance and inflexibility natural to the tree.

The boughs of this tree, being pliant, are easily wove between the bodies of the trees, without any bending of them, for the purpose of plashing. The principal difficulty, in cultivating this tree, lies in making its seeds germinate; but, most probably, this could be easily accomplished, by the means just mentioned for the treatment of the seeds of the Locust.

See also, SEEDS.

Mr. *Peters*, of Pennsylvania, thinks that, in point of elegance at least, the common hemlock *(Pinus Abies Canadensis)* is entitled to a preference to cedar; and that it possesses qualities equally valuable, for the purpose of *ornamental* hedging; and it is for this purpose, particularly, that trees of this description are probably entitled to a preference. Whether the hemlock can be cultivated in any other way, than by layers, we are unable to say.

See LAYERS.

M. *De La Bigarre* recommends the white-mulberry for hedges, particularly on account of the value of the leaves of this tree for feeding silkworms.

See SILKWORMS, and MULBERRY.

It is easily raised from the seeds, or from slips or cutings.

See SLIPS, and CUTINGS.

It may be cultivated in hedges, in a manner very similar to that for cultivating the locust hedge just mentioned.

We might further observe, that there are many kinds of trees and shrubs, which may be cultivated to advantage for hedges; but, perhaps, enough has been said to assist the inexperienced Cultivator, in this important part of field-husbandry. He will probably find that, in addition to all the knowledge he can derive from writen essays, on the subject, some practical experience will still be found necessary, to render him tolerably expert in the art of making good fences, of this description.

HEMP *(Caunabis.)* This plant requires a mellow dry soil, and the richer the better. It turns to but little account, where the soil is not sufficiently fertile. It will grow year after year on the same ground, and it is not so exhausting as some other crops. If the soil be sufficiently rich, it is the surest of any crop; it is subject to no diseases; severe droughts do but little affect it; and cattle will not touch it. From two to three bushels of seed are requisite for an acre; two, where the soil is middling, and three, where it is very rich.

Where the soil is not naturally very strong, some advise having two fields for this culture, which are to bear crops alternately: While the one is bearing a crop the other is preparing for the next season, by ploughings and manuring. This is productive of an extra expense for the rent of the land, &c. but, as very large crops are the essential point in making the culture very profitable, two years' rent of the land may be found but a small drawback in the amount of the profits. If, for instance, two acres can be made to produce a ton, which shall bring three hundred dollars in the market, and half that amount be allowed for the expense of preparing the ground, and raising and cleaning the crop, the surplus profit would be but little lessened by deducting the extra year's rent of two acres.

To enrich the ground, during the alternate years, perhaps two successive green-dressings of buckwheat, ploughed under, might be found of considerable service.

See GREEN-DRESSING.

In this case, the first growth might be ploughed under in the Summer and the latter in the Fall. If barn dung is to be added, let it be ploughed under in the Spring; but if compost, not until the next Spring, when the seed is about to be sown for the crop of hemp; and then let it be well mixed with the surface of the soil. Gypsum will also help the crop, if the soil be suitable for that manure.

Let the ground be well mellowed, by repeated ploughings in the Spring, for the reception of the seed, and let it be harrowed before the seed is sown, and then harrow the seed in. It should be sown pretty early in the Spring; but not before the ground has sufficiently dried and can be put in ample order. The seed should be buried of as even a depth as possible, in order that it may all start equally; otherwise a part of the plants will outgrow and keep down the rest. When sown as early as above directed, it will be fit for pulling or cuting, about the first of August, the time for which being known by the falling of the flowers and withering of the leaves.

The male plants of hemp bear the flowers, and the female plants the seed. A sufficiency of the latter are to be left for seed; and these will require about six weeks further time to ripen; the ripeness being known by the seed turning brown. The seeds may be gently beat off the stalks when dried; or they may be taken off by a coarse kind of comb made for the purpose. The female hemp, which has stood to ripen the seeds, requires a longer time to rot than the male, and when dressed is harsher. The better way is to sow some hemp, thinly, by itself, for seed, and then the rest of the crop may be all pulled or cut together.

In the bogmeadows of Orange county, the hemp is cut close to the ground, with an instrument made for the purpose; but in uplands, which have any little stones in the way, it is best to pull it. In cuting, or pulling, each one takes a swath wide enough to spread the hemp as he goes along. When sufficiently dried, which in good weather will require about a week, it is to be gathered in bundles and bound with straw, and carefully stacked in the field till about Christmas.

It is then to be carefully spread on the snow, and, by being covered with other snows, it will be bleached and improved in its color. When the snows dissolve in March, it will generally be found sufficiently roted; and is then to be taken up and set in small loose shooks in the field. When sufficiently dry, it is to be broken with a coarse break, then carried to the barn to be again broken with the common flax-break, and then dressed in the manner of flax, but more gently, as it will waste with hard beating.

The above is the Orange county method; but the hemp may be roted in the Fall, and then dressed out agreeably to the above directions. It may also be water-roted, which is to be done shortly after it is pulled, and about five days are generally requisite for this purpose. When sufficiently roted in this way, a small handfull may be pulled asunder with a little exertion; and then it must be taken out very carefully, so as not to injure the coat, and dried.

The water in which it is roted should not run rapidly, as such will wash away the coat. Let the sheaves be laid lengthways across the stream, and sunk completely under. Standing water is good for roting; but unless the hemp be once turned, while roting, that which lies uppermost will be roted most, owing to the water near the surface being warmer than that below.

A new method of roting hemp has been communicated by M. *Bralle*, as follows:

Put fifty pounds of hemp, in the stalk, into a vessel filled with water, sufficient to cover the hemp, and previously heated as high as two hundred degrees of Fahrenheit, and into which has been mixed at least one pound of good soft-soap; take away the fire, and let the hemp remain in the vessel two hours; then take it out and cover it with straw, so that it may cool gradually. The next day, spread it evenly on a floor, and run a heavy roller over it several times, which serves to break it; spread it out on the grass for five or six days to bleach; then take it up, dry it, and clean it. By this management, it is stated, that one-fourth more of cleaned hemp may be obtained, than by roting in any other way; the hemp is much softer, stronger, of better quality; and the process of cleaning is much less expensive.

To make this method of cleaning hemp profitable, it must be made a separate business and carried on extensively. Wooden vessels may be used for boilers, and the boiling performed by steam, in the manner described under **Steamboiler.** If a larger quantity of hemp be put into the boiler, the soap must be proportionate, and more must be added, as more water becomes necessary.

The seed for a crop of hemp must be of the last year's growth: That which is older will not readily vegetate.

See Seeds, for the method of making old seeds vegetate.

Some kinds of birds are fond of this seed; and must, therefore, be kept from it when sown.

If hemp be suffered to stand after the right time for pulling, the stalks of the male wither and blacken, and then the coat is of but little value. Where hemp grows too long for dressing, it may be cut in two, without any injury.

Hemp may be made a substitute for flax, for all ordinary purposes; but, in that case, it must be softened by steeping it over warm water, or lye; and, after it is dried again, beating it till it is perfectly soft. The steeping is performed by placing it on sticks, within the vessel, over the water. The Steamboiler, just mentioned, might be applied to this purpose.

No very particular directions are, here intended to be given, in regard to preparing the ground for hemp, by manuring, &c.; all that will be insisted is, that plenty of manure must be applied, evenly to the soil, of such kind as is suitable to it, and that the ground must be effectually ploughed.

HERDSGRASS. *See* Grasses.

HESSIAN-FLY. *See* Insects.

HIDEBOUND. Horses often become hidebound, when they are poorly kept, and badly used. In this case, the animal grows poor, his skin sticks to his ribs, and small boils break out on his back. A method of treatment opposite to that which the Horse has received will generally restore him; that is, keep and feed him well, work him moderately, and loosen his skin by oiling it, and using the currycomb frequently, but not too harshly.

HILLS and VALLEYS. It is found that more rain falls in the valleys than on the hills. The reason of this is, that in the valleys the drops of rain having farther to fall, of course come in contact with, and absorb more of, that vapor with which even the driest atmosphere abounds.

If a goblet filled with cold water be set in a warm atmosphere, this vapor will presently adhere to its sides in the form of water; and in the same way it adheres to the drops of water in their descent.

In this, as in every thing else, the wisdom of the Creator is displayed. The temperature of the valleys being warmer than that of the hills, more moisture is required and more is given them. Hence, too, the reason why many plants, which require much heat, grow best in valleys: They have the requisite degree of heat, and at the same time a proportionate degree of moisture. But as all grasses which are indigenous require only the heat of the hills, they grow as well on them as in the valleys: A good general rule, therefore, is, *the valleys for tillage, and the hills for pastures.*

Two other good reasons for this are: Firstly, when hills are kept in tillage, they are generally more or less washed by the heavy rains, by which much of the best soil is carried off; and, secondly, they are always more or less inconvenient for ploughing, and generally still more difficult for carrying any heavy manures upon them. The above rule, however, is not to be applied to hills of large extent and moderate descent; it is, in strictness, merely applicable to broken hills and declivities.

HOE AND HOEING. Where the hoe is to be used in rough or stony ground, it should be made stronger and narrower; where the ground is light and mellow, it may be broader and lighter.

Hoeing, generally speaking, should be merely the finishing work of the plough or horse-hoe. Where it is used merely by itself, the work is more laborious, and less effectual, as the hoe merely passes over the surface of the ground. It is, however, of great use in killing those weeds which the plough or horse-hoe does not touch, and in duly distributing the fresh earth in its proper place near the plants. Where the plough is not used, the hoe is indispensable.

See more on this subject, in treating of crops that require hoeing.

HOGSTY. A good sty is of the utmost importance in fating Hogs. Nor is it less important for keeping them in Winter; as, the more comfortably they are kept, the less nourishment they require.

The sty should be proportioned in size to the number of Swine it is to contain. One of sixteen feet by twelve is probably sufficient for eight fating Swine. It should be divided into two apartments; that in the rear, which should be about six feet wide, should be close and warm for the Hogs to lie in. Here they should have a constant supply of dry litter, when the weather is cool; for it is an essential point to keep them comfortable. The front part of the sty, which would then be about ten feet wide, should have the floor descending to one side for the urine to run off, and in order that the lower side may be the repository of their excrement; and on this side should be an opening wide enough to scrape it out.

The trough should be on the upper side, covered with one or more lids; and upright pieces should be set before it, at such distances apart as that one Hog only could put his head between any two of them, in order that, while feeding, the weaker animals should be protected against the stronger. The whole should be covered with a roof; for it is essential that they be protected from storms, while they are in the outer or feeding apartment.

According to the foregoing, if sixteen Hogs are to be kept or fated in the sty, it should be thirty-two feet long and twelve wide, and in that case there might be a sleeping apartment at each end. These apartments should again be subdivided, in order that, for the quiet of the animals, particularly in fating, too many may not be forced to lie together. It would probably be best also to divide the feeding apartment; for too many Hogs kept together are not apt to enjoy that peace and quiet which is necessary to their fating well. Posts should also be set up in the sty for the Hogs to rub themselves.

If thirty-two Hogs are to be kept or fated, then, perhaps, the better way is, to have two stys, of the dimensions last described, placed together, with a roof over the whole, and a passage between them for the purpose of carrying food to the troughs.

The upper part of the sty, or some part of it, may be appropriated to storing the different articles of food which are intended for feeding or fating. It would be well also to have the steamboiler under the same roof.

For a description of this, *see* SWINE.

If a part of the roof extended considerably beyond the sty, it would afford a convenient cover for forming a heap of compost from the dung of the Swine.

HOGS. *See* SWINE.

HOLLOW-DRAINS. These are made for the purpose of making land sufficiently dry, where it is naturally too wet for any good culture. At the same time, they are calculated, permanently, to enrich the soil; as, by being thus divested of its superabundant moisture, it is much easier brought into a state of fermentation, and it retains that state a proportionately greater length of time.

It is usually necessary to have leading drains, for the purpose of receiving the water of the smaller ones, and for carrying it off in such direction as may be found most suitable. The descent of the former, as well as of the latter, should not be too rapid; as, in that case, there is danger of the water carrying away some of the earth, which, in that case, is liable to collect at certain places, and thus eventually stop up the drains.

Where the ground is considerably descending, let them be carried in an oblique direction, so as that their descents will be gradual. The leading ones should be sufficiently large to carry off all the water they may at any time receive from the small ones. Let them be from eighteen inches in width, at top and bottom, to three feet, and sometimes more; and let the depth be about three feet, or perhaps four, where they are to carry off much water.

The small ones should be about a rod apart and about two feet deep; or, they may be about a rod and a half apart, and about three feet deep. The shallower they are, the closer they should be together. Their width should depend on the manner in which they are to be constructed.

The best method of making the leading drains is, to fill them about half full with small stones, say, such as weigh from one to ten or twelve pounds; and let these be covered with a layer of such as are small enough to fill up all the chinks; in order that, when the earth is thrown on, it cannot fall down among the stones below. Then throw on the earth that was before thrown out, reserving the best for the top.

But it may frequently happen that stones, of the description mentioned, cannot be conveniently had; and in that case flat stones, if they can be had, or bricks, made for the purpose, must be resorted to; and then the construction should be quite different. If bricks be used, they should be made for the purpose, and effectually burnt; otherwise they will soon crumble away, and thus stop up the drain. Let those for the bottom be made, say, eight inches square, and two inches thick; those for the sides and top, say, twelve inches square, and of a like thickness.

The bottom of the drain, in this case, should be just wide enough to build up the brick-work, in the manner we shall now describe. First, lay the bottom bricks, flat and evenly, on the bottom of the drain; then set up the sides, perpendicularly, the lower edges close to the sides of the bottom bricks, and resting on the bottom of the drain; then cover the whole over with others of the larger-sized bricks, throw in the earth, and the drain is made.

In this case, however, the leading drains should be no deeper than the small ones, in order that the latter may regularly be carried into the former; and, for this purpose, spaces sufficiently large are to be left in the sides of these, for the discharge of the waters of the small drains into the leaders.

If flat stones are to be used, the construction may be similar to the foregoing; or, after the bottom has been laid, the side-stones may be set up, say, ten inches apart at the bottom, and leaning against each other at the top, so that the aperture thus formed by them will be of a triangular shape. Billets of wood, of any durable kind, may also, in like manner, be used for forming the aperture, as such, when buried so deeply beneath the surface, will probably last from fifty to one hundred years.

Where the descent of the leaders is very gentle, there is no necessity of a layer of brick or stone to form the bottom, as in such case the current of the water would not wear any of the earth away; but, where the descent is more rapid, it is necessary to secure the bottom from being washed by the runing of the water; otherwise the drains would soon become stoped: And, where the bottom is thus secured from wearing, the descent of the drains may be considerably rapid, without any danger of being injured by the waters which pass through them.

There are several methods of making the small drains, some of which are more expensive than others. The more expensive methods will be found the most durable; and yet not always, on that account, the most advisable. Suppose, for instance, that by one method of construction the drains would last forever; that this method should cost fifty dollars an acre; that, by another method, which should cost forty dollars an acre, they could be made to last sixty years; which, in that case, would be most advisable?

Undoubtedly the latter. Two dollars and fifty cents put at interest, at seven per cent; and doubling, as it will, at the end of about every fourteen years, give upwards of forty dollars at the end of sixty years; of course there would be a saving of about seven dollars and a half of capital, by making the drains on this cheaper construction.

The most costly construction of the small drains would be such as we have before described for the leaders; but on a smaller scale. The cheaper constructions are, to dig them very narrow at the bottom, and then lay in some substances through which the waters can readily find their way into the leaders. For this purpose, very coarse gravel, which contains little or no mixture of fine earthy matter, has been successfully used, and this generally forms a very durable drain.

The next best method, perhaps, is to lay in a proper quantity of the smaller limbs of trees. Instances are mentioned, by British Writer, where the small limbs and twigs of the beach, and of the willow, had lain in the bottoms of drains for forty years, and were still tolerably sound. They should be laid down in a green state, and in quantity sufficient for all the waters of the drain to pass easily through them; and should be covered with a thin layer of straw, or other fit ingredient, to keep the earth, when thrown on, from falling down among them, and thus impeding the waters in their course.

Another method is, to lay a large roll or rope of twisted straw, say, four inches in diameter, along in the bottom of the drain; and then throw in the earth. The waters, in this case, at first find their way through the straw: But this soon rots away, and leaves a circular aperture, which is the best shape for preventing the earth on the upper side from falling in. This kind of drain will last forty years or more. In this case, however, it would seem that the descent of the drains should not be too rapid, lest the waters wash away some of the earth, and thus eventually stop the apertures.

Another method is, to cut the drain about four inches wide at the bottom, and widening from that for eight or ten inches upwards; then take pieces of the sward, which must be laid aside for the purpose, and cut them into a wedging shape, so that when laid into the drain, with the grass-side downwards, they will only go within about four inches of the bottom, thus forming an aperture below for the passage of the waters. This kind of drain, it is said by British Writers, will last about forty years.

We will mention another method of carrying off the superabundant waters, of mowing and of pasture-land, that is often found very beneficial to the pasture, or to the growing crops of grass: This is to run furrows with the plough, at suitable distances apart, and in proper directions, through the lands; then dig out narrow channels, say, three inches wide, and as many deep, in the bottoms of the furrows; and then lay the sward, turned over by the plough, back in its proper place.

If this operation be properly performed, it may often be found very serviceable, especially where heavy cattle, or carriages, are not suffered to go on the ground.

Sometimes lands may require hollow-draining, which are so shaped as to have no natural outlet for the waters. In such case, let a hole be dug in the lowest part of the land, till a stratum of coarse sand, or gravel, can be found, if at any reasonable depth: Then fill up the hole with stones, as before mentioned, and carry the drains into it, where the waters will sink away in the sand or gravel below.

In Greatbritain, where lands are dearer, and labor cheaper, than in this Country, hollow-draining has been found a very profitable improvement of wet soils. That Country, however, has a much moister climate than this; and, of course, much of the upland soils there are longer in a wet state, than in this Country.

We have, however, considerable lands which would be much improved by hollow-draining: But the essential inquiry is, would not the expense overbalance the additional value confered on the lands by the operation? In many cases, most probably, it would: In others, again, we think the improvement would be found profitable; particularly if the operation were performed in the cheapest manner.

Machinery may easily be contrived for the purpose of cuting the drains, and of closing them again, principally by the labor of Horses, or Oxen, which might be a great saving in the expense.

Bridges, on the construction of the hollow-drain, may often be advantageously used for passing over diches, and small streams. For this purpose, a suitable quantity of stones are to be thrown into the ditch, or channel of the stream, and the chinks filled up, as before mentioned, and covered with earth, and a durable bridge is made. The waters of the ditch or stream pass underneath among the stones.

HOP *(Homulus.)* This plant requires a rich mellow soil, well prepared by diging or deep ploughing. Bog-meadows are good for raising it.

The plants are raised in hills, six or seven feet apart, where the soil is not very rich, and at a greater distance, where it is richer. In the Spring, when the plants begin to shoot, take cutings from branches which grow from the main root: If of the last year's growth, the better; and these are known by their white appearance. Let each have three or four buds; bury them lightly in the hills, with the buds uppermost; allow two or three sets to a pole, and three poles to a hill. For making the hills, first dig round holes about three feet in diameter, a foot in depth, and deeper if the soil will admit it; fill up these with the earth thrown out, well mixed with old compost, if the soil be not already very rich.

The first year, the hills are not to be poled; but the ground in this, as in all succeeding years, is to be kept mellow and free from weeds, by ploughings and hoeings. As the vines rise this year, let them be slightly twisted together on each hill, and let the hills be raised a little by hoeing in some earth round the vines.

Early in the Spring, the second year, and always after this, the hills are to be opened, and the sprouts or suckers cut off within an inch of the old root; but that must be left entire, as well as those shoots which incline downwards, to form new roots. Some manures should occasionally be added, of composts formed of seasand, marle, ashes, &c. with other ingredients, such as roten hogdung, &c.

The poles never should be too long, as the vines never begin to bear much till they have got to the ends of the poles. Set them so as to form a triangle, with one point to the north, and let them meet together at the top. Poles of ten feet are long enough for the first year: After that, they are to be fifteen, eighteen, or twenty feet long, according to the strength of the ground; but never so long as that the vines cannot go somewhat beyond their tops.

About the first of September, or as soon as their color is changed, and they emit a fragrant smell, they are to be gathered. If gathered later, the vines will bear more the next year; but the present crop will not be quite so good.

When the poles are drawn to be picked, cut the vines asunder three or four feet from the ground; for cuting lower, while they are green, weakens the root by too great a flow of sap.

The best way to dry them is on kilns, and this is necessary where large crops are raised; but they may be dried in the sun, or on floors under cover; though these will not be so well flavored, as when kiln-dried. When kiln-dried, let the heat be steady and moderate; for if it turn the hop brown it will be injured. Let them lie about six inches thick, and be frequently turned, while drying. The seeds will crackle a little, when bursting, and then the hops are sufficiently dried.

Before they are baged, they should be laid in a heap, about four days, to sweat and grow tough; and if covered with blankets awhile, they will be the better. The bags are to be of coarse linen cloth, about eleven feet long, and about two and a half yards in circumference, and should contain about two hundred and fifty-weight of hops. The thicker the bag the better they will keep.

To bag them, a hole is made through an upper floor, to which the open bag is suspended; the hops are thrown in, in small quantities at once, and trod down as hard as possible; for the harder the better. When full, sow the bag up as tight as possible. Mind to make four handles to the bag, one at each corner. They are made by tying a handfull of hops in each corner, so as to form knobs, which may easily be held in the hand.

The best poles are those which will last longest. Chesnut is on this account to be prefered. They are to be laid under cover, while not in use. Each pole should have three vines, and all above this should be broken off in the Spring.

A hop-garden, says Mr. *Young*, will last almost forever, by renewing the hills that now and then fail; but the better way is to grub it up, and new plant it, about every twenty-five years.

Mats made of the splinters of ash will answer as well as those made of hair, for the purpose of being used in kilns for drying the hops.

The seed of the hops is the strongest part; and therefore they should always be gathered so soon, that these will not fall out in gathering.

The long white hop is most esteemed, as yielding the greatest quantity and being the most beautiful. Care should be taken to have the hops all of one kind; for, if there be different sorts, some will probably ripen before others.

Some say that the hills in the hop-yard should be covered with manure every Fall, to preserve the roots from the frosts; but this may probably be the suggestion of those who are often so minutely nice, that their practice is not warranted by the expense. Experience, however, is the best guide in these matters.

The culture of hops is very profitable. At the price they command in this Country, an acre of them, well cultivated, will amount to two or three hundred dollars, and the expense, to the acre, of raising them will not be more than one hundred. Nor need the Farmer be fearful of a want of market for them, as they are always a good article for exportation, if not wanted at home.

HORN-DISTEMPER. *See* NEAT-CATTLE.

HORSE. The marks of a good Horse are, a high neck, full breast, a lively eye, a strong back, stiff dock, full buttocks, ribs reaching near to the hips, good hoofs, and a good gait.

Something has already been said of Colts, and of the manner in which they ought to be treated while they are acquiring their growth.

See FOALS.

The next point is to treat of them as Horses; and here a matter of the first consequence is, to break them well.

The common method of forcibly breaking them is absurd in practice, and often dangerous to him that undertakes it. In this case, as in most others, gentle means are best. First, let a young Horse be tamed by leading with a bridle;

then saddle him, and lead him about smartly so as to make him trot; then put weights in the saddle, adding more and more till he carries the full weight of a Man. If he be very fractious, lead him with another Horse. After he has been broke to leading well, and carrying burdens, let him be gently mounted, while some Person holds him, and rode about in a ploughed field, with another Horse before him, if necessary, until he learns to go by himself.

In teaching a young Horse to draw, the same gentleness should be used; first puting him with a gentle Horse that is true to draw; then loading him lightly, and gradually heavier, till he has learned, like his fellow, to exert his utmost strength.

Horses should have a dry pasture, and a good shade in it. Mr. *L'Hommedieu* makes mention of a Horse which was always kept in a dry poor pasture of wild grass; and yet was always fat; and the reason assigned for this was, that the Horse, for want of water, learned to feed at night, when the dew is on, which renders the grass more nourishing.

The best method of keeping working Horses in Summer, where it can be conveniently done, is to *soil* them; that is, to feed them in stables, cuting and carrying in grass to feed them. The grass should be cut and carried in during the morning, while the dew is on. They should also have a yard adjoining the stable, in which they may run at large at times. This practice is a great saving of pasture-land; the Horses will keep much better, and they are always at hand for service.

Clover, whether green or dry, is considered one of the most nourishing grasses for Horses; but, if clover-hay be fed to them for some time, it produces too great a degree of looseness. Clover and timothy together is therefore the best. When grain is given them, let it be either ground, or boiled.

A Horse never should be exercised so severely as to make him sweat profusely; or, if he be, let him be well covered until his skin and hair be dried, and in the mean time thoroughly rubed down. He should at all times be kept clean, and his skin curried, but not too severely.

A very common error with Farmers is, to keep more Horses than they want, and to keep them all but poorly; but the reverse of this only can be called economy. Keep but few Horses, and keep them well. On a stock or dairy-farm, of a hundred acres, two Horses, if properly kept, are sufficient; and double that number is enough on a farm of the same size that is kept under the plough; or rather, on such farm, two Horses and a yoke of Oxen may, perhaps, be found advisable.

When a Horse is on a journey, he should be fed with hay and provender, and not turned out to grass at evening, for his joints to be stiffened by the dampness and cold of the night, after the warm and severe exercises of the day. To prepare him for a journey, he ought also to be previously kept to hay, with provender, and have moderate daily exercise, in order that his fat may become more solid, and of course his body better enured to fatigue. He ought also to be shod some days before, in order that the shoes may become easy to his feet.

It would be desirable to have a remedy for the dryness of hay, so as to render it a more agreeable food for Horses. Set a basket of snow before a Horse, while at hay, and he will take a mouthful of hay and then of snow, alternately; which shows that something is needed to supply the waste of saliva which is absorbed by the hay while eating. In Summer, Horses might have water constantly before them, but the coldness of Winter precludes any substitute but snow, unless something of this kind should be found in feeding plentifully with carrots. These they are fond of, and it is found that they will keep them as well as oats, and faten those that are lean. Some other kinds of roots would, perhaps, answer equally well, particularly when steamed.

It is chiefly what may be called a comfortable state of existence, or a freeness from suffering, which occasions a Horse to grow fat; and therefore, the less they suffer from thirst, from want of agreeable food, or comfortable stabling, or from too severe exercise, the easier they may be kept in good order. These things are apt to be little attended to; and in this way animals entrusted to our care, which it is our duty to make comfortable while they exist, are often neglected and left to suffer.

A disorder, called *Ptyalism*, has for some years past been gaining ground among Horses in Pennsylvania, and is extending to those of this State: This is an excessive watering or slavering at the mouth, which prevails mostly during the middle and latter part of the growing season, and tends very much to impoverish these animals, and sometimes even kills them. Various causes have been assigned for this; but none of them satisfactory. There is, however, a certain remedy for the disorder; this is to soil the Horses.

See SOILING, &c.

And to sprinkle the grass thus fed to them with a small quantity of some grain, suitable for them, ground fine. This remedy has the peculiar advantage of being one that is profitable, where some suitable grass is kept for soiling.

Mr. *Peters* says that this disease of Horses prevailed in Pennsylvania, before the introduction of gypsum as a manure in that State; and thinks that the true cause of the disorder has not yet been truly ascertained, as hay made of the second growth of grass frequently produces it. He finds also, that soiling Horses on red-clover, when this grass has become rather too much ripened, frequently has the same effect.

Mr. *Perlee* contends, however, from the result of experiments he has made, that the plant called *Euphorbia Maculata*, growing among red-clover, produces the complaint; and that this plant will also produce a similar effect, when eaten by other animals. It is of an acrid and poisonous nature.

Dr. *Mease* makes mention of a mill used in Pennsylvania, for grinding Indian corn together with the cob, which is much approved, where it is in practice, for making a more valuable food for Horses, than grain ground in any other way; as the cobs of themselves possess considerable nutriment; while, at the same time, as Dr. *Mease* observes, this increase of bulk serves to afford the stimulus of distension, which is as necessary, for either Man or beast, as the nutrimental parts of food.

No doubt the same method of managing this grain would be found equally advantageous for fating other cattle.

It is also found that meal, of all sorts, when fermented and baked, will go twice as far in feeding Horses, or other cattle, as that which has not undergone these operations.

Lord *Dundonald* recommends malting of grain, before feeding to Horses, in order to fix its sacharine quality.

When the teeth of an old Horse meet together they project outward, so as nearly to form a right angle; those of a young Horse meet almost perpendicularly; those of a middle-age are a medium between the former and latter; so that the age of a Horse can be very nearly ascertained by attention to these circumstances. The lips also of a young Horse are firm and hard, and his mouth is very fleshy within the palate. The lips of an old Horse are soft and flabby, and easy to turn up, and his mouth is lean above and below the palate, and seems only to have the skin over the bones. The teeth of the young Horse are usually short; of those that are old, usually long; though these signs are not always certain.

The eye of an old Horse usually appears sunken; that of the young more full. The ends of the teeth of a two-year-old Horse have no black spots; at three, they have two of these in the two middle under teeth; at four, they have four such spots; at five, they have six, each front tooth then having one; and at six these spots disappear in the four middle teeth, and are only seen in the two next the tusks, which at the age of five make their appearance. Those well experienced in these matters have other signs, by which they can judge pretty nearly of the age of a Horse, after he has passed six years, but not with certainty.

See further, Mares, and Foals, &c. For the diseases of Horses, *see* Botworms, False-quarter, Farcy, Foundering, Gigs, Glanders, Gripes, Hidebound, Lampas, Pollevil, Scratches, Spavin, Staggers, Strain, Surfeit, Tumor, Vives, Ulcer, Wheezing, Windgall, and Yellows.

When Horses, by long journeys or otherwise, have the skin rubed off their backs, let a little dry whitelead be occasionally sprinkled over the raw flesh, which will soon heal the sore. Persons on journeys ought always to carry some of this article with them, for this purpose. When the withers of the Horse are wrung, and swelled by means of bad saddles or otherwise, the swelling may be allayed by washing the part with brine, or with salt and black soap mixed together, applied to the swelling. Any restringent, such as alum beat up with the white of eggs, is also good.

HORSE-HOE. This is a kind of plough invented by Mr. *Tull*. It differs from the one-horse plough, in having shafts like those of a one-horse carriage, and the plough is regulated in a great degree by the shafts, so that much depends on the steadiness of the Horse.

The shafts serve to regulate the depth the plough is to run. They are more convenient in turning, as there are no trace-ropes, or chains, used in drawing, for the Horse to get his legs over.

See further, Plough.

I.

IMPROVEMENT of LAND. This is to be effected in various ways, and by various means. Some lands are naturally sterile from the want of moisture; some, from having too much of this; some, from being destitute of certain ingredients in the soil; and some, from being too rough and stony for any profit in tillage.

In the Southern States, too, there is much land that has become sterile by severe croping with tobacco and Indian corn; and, by being left bare, has washed much into gullies by the rains.

Many dry, sandy, and gravelly tracts may be converted into a state of fertility, by the addition of clay or marle to the soil.

See MANURES.

There are also particular grasses that flourish in very dry soils, which would enable the Farmer successfully to pursue the soiling-system of culture in such lands.

See GRASSES, SOILING, &c.

Where such soils are, however, at the same time very broken, perhaps the culture of the locust would be found the most profitable to which they could be applied. The mulberry might also be cultivated in the lower and richer parts.

See LOCUST and MULBERRY.

The soil of the county of Norfolk, Greatbritain, in its original state, was mostly a poor weak sand, very similar to much of the lands lying between the cities of Albany and Schenectady, and to several extensive pine-plains which lie in the county of Saratoga, and elsewhere in that vicinity. But this poor soil has, nevertheless, been rendered nearly as productive as any in that Country; and this has been wholly effected by proper manures, to make it more retentive of moisture, and by a system of husbandry adapted to the soil.

It is there that the culture of turnips, for feeding and fating of cattle, is most extensively pursued. Those who cultivate those lands have long since discovered, that the only way to make them profitable for cultivation is, to stock them with as many Neat-cattle as can be fed and fated upon them; which affords the manures that are essentially requisite for such soils. They need little ploughing, but much manure; and that of Neat-cattle is particularly fited for them. The soiling-system is admirably calculated for such lands.

But, before such soils can be well fited for good cultivation, they require some manure which will endue them with more solidity, and thus make them more retentive of moisture; and this is only to be effected by sufficiently loading the soil with the earth of bogswamps, or that dug out of ponds, or with upland marle, or clay, or loam. Probably peat, or turf, when completely decomposed by the acid of lime, in composts, may be found to answer pretty well for this purpose.

See MANURES.

Of marle, or clay, or other rententive earth, as much as one hundred loads to the acre are usually requisite in the first instance for such soils; and then, with the aid of clover, and other grasses suitable to them, and with gypsum, and the manure which the cattle afford, made into suitable composts, or otherwise, they will be found very pleasant and profitable lands for such growths as are suitable to them. And they will be found suitable for most crops, even for wheat, where it is sowed on a clover-sward turned under.

After such soils have thus been made sufficiently retentive of moisture, they will, perhaps, be found as profitable for cultivation as almost any soil whatever; and for this reason, that although they will afterwards require more expense in manuring, than is requisite in the stronger soils; yet this expenditure will be found balanced by the greater ease with which they can be properly fited, by ploughing, for growing of crops.

They require but little ploughing, and but little strength is requisite for performing it. In most cases, one ploughing, if properly performed, is sufficient; or two, at most, will only be found necessary. Where a clover-sward of such soil is to be turned under, two Horses will be found requisite; but for merely stiring the ground up, where there is no sward, the strength of one good Horse, or of two Asses, will be found fully adequate.

See Ass.

Or the double plough, which turns two furrows at once, may be used in such case, and drawn by two Horses or two Oxen.

See Plough.

In the counties of Albany, Schenectady, Saratoga, and Warren there are plains of light sandy lands, to the extent of perhaps one hundred thousand acres, which, if they were improved, and cultivated, in the manner just described, would probably give ample employ and support, to at least one thousand Farmers; while, at present, those lands are almost wholly unproductive. And, as far as those tracts have come under our observation, it is believed they are bottomed by substrata of clayey marle, or of blue clay; either of which, applied to those soils, would answer well for imparting to them the requisite degree of solidity, and tenacity of moisture.

The average expense of manuring these grounds, with one hundred loads to the acre of clayey marle, clay, or strong loam, would probably be about twenty-five cents a load, or twenty-five dollars an acre. The land thus manured would be worth from forty to sixty dollars an acre, according to its proximity to market, and to the goodness of the material used in thus improving the soil.

Mr. *Young* makes mention of British Farmers making their fortunes by bringing poor sandy lands, of the above description, under profitable cultivation, by the aid of clays, or clayey marles, for manuring them. A marle having much sand combined with it would be unfit for this purpose.

It is only the tolerably level parts of such lands, which should be selected for thus improving. Those which are broken are generally too sterile, and to little retentive of manure, to be improved to any advantage, otherwise than by planting them with locust, for which they are very well adapted.

Sometimes, too, some parts of such soils will be found closely underlaid with a sand too coarse to be made sufficiently retentive, by any reasonable expense; these should therefore be cultivated with the locust, or perhaps with fruit-trees, if they will thrive on such soils.

Our sea-coast abounds, in many places, with much sandy lands, which need improving in the manner just mentioned. Under MANURES, the Reader will also find some hints, relative to a method which might probably be advantageously adopted, for improving all lands which lie adjoining, or near, every seashore, by manuring them with sea-water.

Where lands are too retentive of moisture, and at the same time not too level nor too steep, they may be greatly benefited by hollow-drains.

See HOLLOW-DRAINS.

Where they are flat meadows, marshes, or morasses, they are to be laid dry by open drains.

See BOGMEADOWS and DITCHES.

Where they lie too low for any draining of this kind, they are either to be raised by the means of *warping*, or the water is to be raised out of the ditches, for the purpose of being thrown back into the river, ocean, or elsewhere, whence they came, by the means of wind machinery.

In this manner, a large proportion of Holland has been redeemed from the ocean; and considerable tracts in Cambridgeshire and Lincolnshire, in England, have in like manner been made very productive for grass.

In this case, the ditches, which are to be large and proportioned to the extent of the tract drained off, are to be run to that point where it is most convenient to raise the waters out of them by wind-machinery, to be carried off. But, in order to do this, a dyke, or bank, is first to be raised round that part of the land adjoining the side whence it is overflowed; or, if it be an island, it is to be banked all round. The bank is to be of a height and thickness suitable to the weight and turbulence of the waters it may at times have to encounter from without.

It is advisable to plant the outside of these banks with the shrub-willow, which grows along the banks of the low-lands of many of the small rivers of this Country; but by no means should such banks be planted with trees of large growth, as these are liable to be upset by the winds, and might thus do great mischief, by leting in the adjacent waters.

There are many tracts of marshy lands on our sea-shores, which might be rendered very valuable by being thus imbanked, then ditched, and having the waters of the ditches thrown over the banks, by the aid of wind-machinery.

See that article.

Between Hoboken and Newark, in Newjersey, is a large tract of this description. Such lands being strongly impregnated with the salts of the ocean, are generally very fertile, where they are laid sufficiently dry for the plough; and, in such case, if they are laid down with meadow-cats-tail, or other grass suitable to the soil, they will yield double, perhaps treble, the amount which they bore of the salt-grass, with which they were covered in their natural state.

In the county of Orange is a very large tract, called the *drowned-lands*, which never can be effectually drained, but by the method above mentioned; and the same may be observed of another large tract, adjoining the Sacondaga river, in the county of Montgomery. The like observation may be applied to the great tracts of marshy and swampy lands on the Senaca river; to the tract called the *Tonnewanta swamp;* and to many other tracts, within and without this State, which need not be here designated.

Another great improvement of swampy lands is effected by liming them, after laying them dry by ditching. It is particularly useful in all grounds which are covered with a peaty or turfy matter, from which little or no vegetation is to be expected.

By mixing lime with surfaces of this description, a further decomposition of this vegetable matter takes place, and it becomes reduced to a solid and fertile mould, capable of sustaining vigorous growths of plants suited to such soils.

But this is not the only benefit derived from the process; as the lime destroys the *miasma* which is often so abundantly produced in such soils, as to render them the seats of pestilence and disease.

The liming of swamps for the double purpose of rendering them healthy, and increasing their fertility, was first suggested by *Linnæus*, and is said to have been of late very successfully practised in Greatbritain.

See Manures, for the quantity of lime to be used.

Along the banks of rivers, many low tracts of land may be greatly improved, by raising them higher with the sediment of the waters. In this way, much has been done on the banks of the Don, the Ouse, and the Trent, in Greatbritain. The land which is thus to be raised has, first, a dyke or bank thrown up round it, similar to that just described, for the purpose of keeping out the waters of the river, except at the place where a gate is to be erected to let them in. When they are to be let in, that is, when they are muddy and have considerable sediment to deposit, the gate is to be raised; and, after the sediment has been deposited, they are let off again; and a new supply is taken in at the next tide, or at the next flood, as the case may be.

Mention is made, by the Compilers of 'The Complete Grazier,' of lands on some of the tidewaters of Greatbritain having been raised two feet higher, by this method, in a short time. The progress to be made in thus raising the land must, however, depend on the depth to which the waters cover the land, the quantity of mud or sediment they contain, and to the frequency with which the land can thus be flooded.

The sediment which is thus deposited makes a very fertile soil; but most fertile where it is the sediment of tidewaters near the ocean; as in that case the soil, thus made, must be strongly impregnated with the salt of that water.

Probably little or nothing could, in this way, be effected by the tides of our rivers; as the tides here do not generally rise sufficiently high, to produce a current so rapid as to stir up mud for forming much sediment: But there is every reason to believe, that much of our low, swampy, intervale-grounds might be greatly benefited, by leting in the waters of the adjacent river, during a flood, and having the sediment all deposited before they were let off again.

But this plan appears to be admirably calculated for filling up the vast swamps, which abound so much on the Missouri and the Mississippi. Those rivers, during high water, contain a greater proportion of mud than perhaps any other streams; and at this time the waters can readily be carried through the levees, into the lower back grounds, after they have been properly imbanked; and, in due season, let off again, either into the bayous, where these are found, or into the rivers, after the waters have subsided.

In this way, it would seem that the immense intervales, which every where border on those streams, may be redeemed from the dominion of the waters; that the same sediment which serves, in the first instance, to raise the lands higher, may afterwards be used, when necessary, for the purpose of manuring them; and thus a second Egypt may be artificially created, of vastly greater extent than the tract of land which is enriched by the overflowings of the Nile.

Lands which are liable to be inundated, by the rise of rivers, may also be protected from the waters, by imbankments on each side of the streams; which is the method adopted on the cultivated parts of the Mississippi, on a great extent of the Euphrates, and on many other streams; and, during the season of high waters, great care is requisite to prevent their breaking through the banks, and thus inundating the adjacent lands.

Much lands in their natural state are found covered with a turf or peat substance, and sometimes of very considerable thickness, particularly those which are more elevated, and in more northern latitudes. Large tracts of the high lands, which lie northerly of the settled parts of Herkimer and Montgomery counties, are of that description. The soils thus covered are usually of pretty good quality; generally best fited for grass, however; though sometimes they are merely poor sands.

The mass with which they are covered appears to be a mixture of wood and vegetable matter, which has only undergone a partial decomposition; owing, probably, to the coolness of the surrounding atmosphere, which is formed by the shade of a thick growth of wood; for, if this be cut away, and the sun let in, this mass will gradually undergo a further decomposition, and at length be so reduced in bulk that it can be mixed, by the plough, with the soil beneath, and thus rendered productive.

This mass, also, when mixed with a due proportion of lime, in composts, will undergo a rapid decomposition, and thus be rendered a good manure.

The bringing of such lands under cultivation can only be effected gradually; time must be allowed for the purpose. The heavy growths of timber with which, in this Country, they abound, may be exhausted in manufactories, of various kinds, which require the use of much fuel; and as the heat of the sun will, in due season, dissipate the incumbrance which covers the soil, it can, at length, be brought under that cultivation to which it is best suited. Such grounds, even in their crude state, will, however, bear tolerably good crops of potatoes.

Low morasses are frequently composed of turf, or peat. *See* those articles.

If such lands can be flooded, by water brought upon them which has a sediment to deposit, in the manner before mentioned, they may thus be converted into fine lands.

Mention is made of this having been successfully performed, in Greatbritain, where the water was brought a considerable distance; and also of grounds of this description having been made fine meadowlands, by means of the most approved method of irrigation practised in that Country.

See WATER.

If such grounds cannot be improved in either of these ways, they may be rendered tolerably good for grass, by frequent ploughings, in order completely to rot the surface, and manuring it plentifully with sand, or other suitable earth.

Sometimes lands of very good soil are found too closely underlaid with limestone, or other rock, to be sufficiently retentive of moisture, in times of drought. Such may, nevertheless, answer very well for orcharding, for the smaller fruit-trees, or for pastures, by having considerable growths of locust, at the same time, on the grounds, as these will, in a great degree, prevent the effects of drought.

Lands which are very rocky, or stoney, may still be very valuable for fruit-trees, for pastures, &c. The clearing such of these incumbrances is sometimes a matter of no small difficulty; and it is always advisable to calculate, whether the additional value of the land, when cleared, will warrant the expense, an additional inducement, however, for incuring the expense, is, that these incumbrances are usually good materials for making the most substantial kind of fence.

The Southern Planter often finds himself in possession of large tracts of lands, which have been exhausted by the constant culture of tobacco, and Indian corn. These tracts are frequently turned to commons, and are then called *old-field*. In this exhausted state they, perhaps, do not yield the Owner six cents an acre, by the year. How shall he renovate these lands, and thus restore fertility and beauty to some of the fairest portions of the earth, which have been blasted and desolated by the hand of Man?

The Planter must change his mode of culture; he must pursue a system as good, as that which laid his lands waste was bad. He must keep his lands well stocked with clover, or other good grass, and keep as many cattle as he can find means of supporting, in order to enable himself to make as much manure as possible. He must feed his lands with every kind of manure which is proper for them; pursue the soiling-culture, as far as that may be found suitable for his grounds; plough often, and well; and he will soon find that his now barren wastes will bloom with increasing verdure.

Those parts, however, which have been too deeply gullied by the rains, to be easily leveled again, should be planted with locust, or other valuable wood.

It has been generally observed, that when crops are suffered to stand on the ground, until they have fully ripened, they exhaust the soil considerably more, than if taken off in a greener state. The same is the case in regard to weeds of every description. Perhaps the remark is not so fully applicable to crops of roots.

It may therefore be said that lands are negatively improved, in a saving of their usual exhaustion, by taking such crops off the ground as soon as they have attained a sufficient degree of maturity.

This is a matter that is worthy of consideration, especially when it is remembered that several kinds of crops may be severed from the ground, without injury, in some cases with a saving, before they have fully ripened.

Thus, Indian corn may be cut up while the stalks are still green, and set up in shocks for the ears to harden; and in this way much good fodder will be saved. By harvesting oats while the stalks are somewhat green, they will be the better for fodder, and the grain will receive no injury thereby. The same may be observed, to a certain extent, in regard to crops of wheat and rye.

Flax pulled when just out of blossom is much the best; but in that case the seed is lost; which, however, is not always of much account. The pea-crop is injured by standing too long; as in that case the haulm becomes of little value.

In short, no crops of grain derive any benefit from standing until the stalks are completely dead, except when the grain is to be used for seed.

The improvement of land is also to be effected by various other means, which will be treated of under different articles of this work.

The improving of a Country in the highest degree, not only by making its natural barren tracts as highly productive as they will bear; but also by adding the highest additional fertility to the better parts; is the foundation of its wealth and prosperity.

The lands of a Nation are its principal capital: If these, therefore, become so exhausted, or be suffered to remain so little improved, as to yield little more in products than what is merely equal to the value of the labor bestowed on them, the condition of that Nation must, in general, be poor; that of its Farmers, in particular, can be but little better than that of the Laborer who has to earn his daily bread.

But if the lands be generally so improved, and enriched, as to yield twenty dollars in product, for every ten dollars bestowed upon them in labor; then the Farmer may grow rich, and his affluence will be more or less felt by all classes of Community.

By highly improving a Country, also, its population may be doubled or perhaps trebled; and, by thus bringing the Members of community closer together, much labor is saved in their necessary intercourse; much in going to Church, to Mill, and to Market.

Great national works, in constructing canals, roads, bridges, &c. will benefit a greater number of People, in proportion to the expense; and national defence, in war, is much more costly, for a widely-extended population, than that which is compact, as we have found by experience.

Good culture, when bestowed on highly-improved lands, may be said to be a source of rational pleasure; while that which is usually given to lands which are but poorly improved, is most commonly productive of much toil, and vexation.

INARCHING. Sometimes called grafting by approach. It is the joining of two young trees together, that stand sufficiently near each other for that purpose. A part of each, of the same length and width, is to be cut away, so that, when the trees are brought together, the pared edges of the rinds will exactly join. A tongue should be made in the one, and a slit in the other to receive it; to keep the parts from sliping, they are to be bound firmly together, and coated with wet loam, or otherwise, as is directed in GRAFTING. After about four months, they will be so well joined that the top or bottom of either part may be taken away at pleasure; so that in this way the top of one tree may be set on the stock of another. Let the parts taken away be cut pretty close and sloping, and cover the ends with *Forsyth's* composition, or with a coat of wet loam.'

This operation is to be performed in April or May, and is commonly practised upon myrtles, jassmines, walnuts, firs, pines, and other trees, that will not succeed by common grafting. *Forsyth*, however, observes, that the trees thus reared will be weakly.

INDIAN CORN *(Zea.)* This plant is a native of this Country, and seems to be adapted to every part of it that is tolerable to be inhabited. There is but one species of it, though many varieties, owing perhaps principally to the variations of climate. It requires a warm Summer, and this is afforded even beyond the most northerly parts of our territory. It is a very valuable grain for almost every purpose; its great increase when properly cultivated, and the trifle that is required for seed, must ever render it a favorite of the Poor, as well as an article of profit with the Wealthy.

The praises of '*the hasty-pudding*' have been deservedly sung; and surely those, at least, whose 'bones are made of Indian corn,' will readily assent to the eulogiums of the Poet on the cheap, yet delicious, meal which this puding, with milk, affords. It is to be hoped that our Farmers will never so far ape the fashions of the Proud and Wealthy, as to acquire a taste sufficiently vitiated to reject the hasty-pudding; as it is believed that a proper proportion of this diet is as well calculated to raise a fine, hardy, and comely race of Men and Women, as perhaps any other whatever.

The Author of 'The Wealth of Nations' observes, that those of the Irish, whose principal food is potatoes and milk, are the handsomest and best-made of any People in Greatbritain: But, in point of taste, the hasty-pudding is very far superior; and is probably better calculated to nurture rising generations of the first order, such as, with proper culture, will be better fited to be 'the Lords of human kind,' than those who arrogantly assume this preeminence.

In Kentucky, and elsewhere on the rich lands of the Ohio, a hundred bushels of Indian corn are frequently raised to the acre. This has also been done in this county (Herkimer); but so great a crop in this northern climate is not to be expected, unless on some chosen spots, and where the best cultivation is bestowed. Two very large crops which were raised near the city of Newyork, some years since, deserve, however, to be noticed, as specimens of what good culture is capable of producing in this State.

Mr. *Stevens*, who raised the largest of these crops, each being the product of three acres, ploughed his ground three times, and previous to the last ploughing carted on seven hundred horsecart-loads of street-manure. He planted his seed in double rows, about eight inches apart, and the seeds were set, diagonally, the same distance from each other: Between each of these double rows was left a space of five and a half feet. During the season, the crop was suckered three times, and the intervals were repeatedly ploughed, and kept clear of weeds by hoeing and hand-weeding. His product was one hundred and eighteen bushels to the acre; and it would probably have been greater, had not a thunder-storm injured it, by blowing most of it down at the time the ears were seting.

Mr. *Ludlow*, who raised the other crop, had ninety-eight bushels to the acre. He, however, carted only two hundred loads upon his three acres. He planted his seed in single rows, which were four feet apart, with the grains set eight inches asunder. Probably the reason of this crop being less than the other was on account of less manure having been carted on; as it is doubtful whether planting in double rows is better than planting in single.

From all this, it appears, that a greater quantity of Indian corn can be raised on an acre, than of any other grain; and, considering its nutrimental qualities, it may safely be said that, next to rice, a given piece of ground cultivated with this grain will support a greater number of People, than that which is cultivated with any other grain whatever.

The proper soils for this grain are the sandy, sandy-loam, gravelly-loam, and rich red, or dark-colored earths, which have no clay in them. Stiff clays are very unfit for this crop, and cold or wet loams are not much better, unless well managed.

See CHANGE OF CROPS, for the best method of managing such soils.

Where sward-land is intended for Indian corn, it should be broken up in the Fall; and, if it be a stiff or wetish soil, it should be thrown up in high narrow ridges by a second ploughing. In the Spring, the ground should be well mellowed with ploughing immediately before planting. Whatever fresh barn-dung is to be applied, should be ploughed in. Planting in rows, agreeably to the methods before described, is best, as in this way about one-sixth part more can be raised from the acre.

As soon as the plants have got to the height of six or eight inches, run a furrow, with a onehorse plough, as close to the rows as possible without injuring the roots, turning the furrows from the plants, then immediately turn the furrows back again, so as effectually to mellow the mold into which the roots are shortly to extend. Let this ploughing be of a good depth: The hoe is to follow and complete the dressing. In due season, the plough is again to be applied, runing the furrows farther from the plants, and turning them towards them; which is again to be followed by the hoe.

After this, another hoeing should be given for the purpose of extirpating all the after-growth of weeds, which in old ground are apt to spring up; but any further ploughing, unless at a considerable distance from the rows, will be found of little use to the roots; and the stalks, which are now very tender, will be easily broken.

In raising this crop, the essential points in tilling the ground are, to keep it mellow and clear of weeds; and, therefore, ploughing immediately before planting, and then again stiring all the ground that can be stired, by first ploughing closely from the rows, and then back to them, answers the purpose of mellowing most effectually. As the roots extend into the ground thus mellowed, that part only into which they have not yet extended can, with any benefit to the roots, receive any further mellowing from the plough.

It is essential to have this plant started well; because, if it get stunted at the outset by cold rains, it seldom gets the better of this during its whole growth, particularly if the soil be not perfectly suitable to it. To prevent this, it is advisable to apply some stimulants to the plants at that time; and the best for this purpose are bogdirt, marle (dug out of bogswamps) ashes, and gypsum. The latter ought, however, to be prefered on all soils to which it is suitable, because it is cheap and easily applied.

Where a soil is wetish, it ought, after being well mellowed, to be thrown up into ridges, by having two furrows thrown up against each other, at proper distances, and on the top of these ridges let the seeds be planted, the Planters carrying their rows crossways of the ridges.

Where furrows are made for planting, they ought to be shallow, not more than half the depth of common ploughing. It would be as well to have no furrow at all, but merely to harrow the ground smooth before planting, and then to plant in rows, by a line or mark drawn along the ground by hand, with an instrument made for the purpose. A more complete method, however, is to drill in the seed, by a light drill-plough that may be easily made for the purpose. One of this description may be drawn by hand; and may be so contrived as to make a small furrow about two inches deep, drop the seeds at proper distances into the furrow, and cover the seeds, all in one operation. These methods, however, are for ground that is clear of stones.

If this crop be harvested too early, it will lose much by shrinking. It is also found, by experiments, that where it is toped at the usual time the crop will be considerably less, than if it stand without toping. If, therefore, it be toped at all, it ought not to be done before the grains have hardened. It is believed that the best plan is to cut up the stalks by the roots, some days after the usual time for toping, and set it up in shocks to harden.

In this mode, the ears derive the same nourishment from the stalk which they do when it is left standing. A large additional quantity of valuable fodder is thus saved; while at the same time the ground is cleared of its incumbrance, so as to be ready for sowing a crop of wheat the same Fall. The additional labor of husking out the corn in this manner is very trifling. The shocks are to be of such size as can be conveniently tied together at the top, by bands of straw, in such manner as too keep out the rain.

The best and soundest ears should be selected for seed, rejecting the grains which grow near each end. In order to accelerate the growth of the crop, it is sometimes advisable to soak the seed in water a little warm, for about twenty-four hours. Another method is to pour boiling water upon it; let it stand on it about half a minute; then cool it as soon as possible, and plant it before it dries. In this manner the seed will come up much sooner; but if there should be cold rains, immediately after planting, there is danger that it will not come up at all.

See SEEDS, for a safe method of quickening its growth.

If the seed be smeared all over with tar, and then have ashes or gypsum sprinkled on it sufficient to render it fit for handling, and be then planted, neither birds nor squirrels will touch it. In this case, however, it is necessary first to soak it sufficiently to make it vegetate; as, without this, the coat of tar will keep out the moisture, and prevent the seed from sprouting.

The proper time for planting depends on the climate. In this State, however, from the 20th of May to the first of June, is about the best time. The old Indian rule, which perhaps is the best, is to plant when the leaves of the oak tree have grown as large as a squirrel's foot.

A change of seed is advisable with this grain, as with all others; but a change of seeds grown on different soils is perhaps the most requisite. Changes of this seed ought rather to be from east to west, or from west to east, allowing the climate to be the same, than from north to south, or from south to north. If it be carried from the south too far to the north, the crop will be large, but will not ripen before the frosts; and if carried from the north too far to the south, it will ripen earlier than is requisite, but the crop will be small. But it must be remembered, that climates often depend on altitude as well as on latitude. Where this crop is raised on bogmeadows, which are always subject to early frosts, the seed should be brought from the northward, in order that it may ripen before the frosts.

Of the varieties of this plant, those which have the longest ears and the largest grains will yield most; but Farmers, in many situations, must have regard to that kind which ripens earliest, whether the most productive or not.

The practice of making very large hills to this crop, while growing, is unnecessary. The principal point in hoeing is, to destroy all the weeds, drawing at the same time a little fresh earth round the stalks while young. There ought, however, to be sufficient of earth eventually drawn round to support the stalks. The growth of suckers is injurious to the crop, and ought to be either pulled up, or bent down to the ground and covered with earth sufficient to kill them; and this is believed to be the better way, as by this mean the principal stalk is not injured by wounding. It is said that sprinkling some gypsum on the silk of the ear will make it fill to the very end.

Indian corn will grow many successive years on the same ground; but it is not advisable to plant it more than two years successively, as it is a crop which exhausts the soil. Like some other crops, it cannot be overdone by manuring; but, on the contrary, the richer the soil the greater will be the clear profit; and if the ground be left too rich for wheat or barley, it can be put to the more profitable culture of hemp.

This plant may be gradually habituated to a more northerly or southerly climate. For instance, take the Virginia corn and plant it one or two miles farther north every Summer, and by the time it has got into Canada it will be the small Canada corn, and *vice versa.*

Thus far we have thought proper to insert this article, as it stood in the first Edition of this Work; as we see no particular reason to make any essential alteration; though some addition to the article may, perhaps, be acceptable.

A method has been mentioned to us, of preventing birds and squirrels from pulling up the corn, which is to soak the seed, and then roll it in sulphur, and plant it immediately.

Sulphur is of itself a manure; but by no means so efficacious for this grain as gypsum; and in this it should always be rolled, after being soaked a few hours, before planting. The effect of this application on the growing crop is very great indeed.

Perhaps a little sulphur mixed with the gypsum might render the seed sufficiently obnoxious to birds, &c. If not, perhaps the better way would be to omit the sulphur, by which more gypsum could be used; and, for preventing the depredations of birds, &c. scatter Indian corn over the field, at the rate of about two quarts to the acre, after planting; on which the birds, &c. will feed, without attempting to pull up any of the young plants.

In soaking the corn for seed, add some saltpetre to the water used for the purpose; and let as much gypsum be used, in rolling the seed, as can be made to adhere to the grains.

Some have pursued a method of planting rows or drills of Indian corn and potatoes, alternately, to much apparent advantage; this giving the corn more room for the roots to extend in search of food, without any essential injury to the intermediate drills of potatoes. Perhaps it might be found, in some instances, as advantageous to plant pumpkins, as the intermediate rows.

See PUMPKIN.

A crop of Indian corn, in the Southern States, requires more ploughing and hoeing, than in the Northern, on account of the greater length of time requisite to mature the corn which is grown to the south. At the same time, the southern corn will not yield more, to the acre, than that which is grown to the north.

Would it not then be more advantageous to the Southern Planter to cultivate the northern corn; as in that case less ploughing and hoeing would be found requisite; and he might raise the northern corn, after first mowing a crop of red-clover off his land; as the clover-sward, turned under, would be a fine lay for the corn-crop?

We observe that Mr. *Bakewell*, of Montgomery county, Pennsylvania, derives great benefit to his corn-crop, by covering the seeds with the earth of trench-ploughed furrows. This, we think, only indicates the propriety of trench-ploughing the land entirely; by which mean double its present product would probably be obtained, of every kind of crop.

We will conclude this article, with the insertion of a communication of Mr. *Steele*, of Philadelphia, to Mr. *Peters*, describing his method of cultivating Indian corn.

'I plough the ground, carefully, about six inches deep; after which I spread lime, at the rate of forty-five or fifty bushels to the acre, which I mix with the surface, by the use of the common harrow; then mark the ground, with a shallow furrow, for planting (the corn-rows five feet apart) drop the seed three or four feet from hill to hill, and cover in the usual manner.

'When the corn is up to the height of three or four inches, I give each row a stroke with a common harrow, relieving any of the plants, that may be covered in the operation, with a small rake adapted to the purpose. When this is completed, or within a few days after, I commence what is generally termed moulding. This is performed by two strokes, between the rows, with what is called a coulter-harrow (its teeth being coulters in miniature) which completely mellows the ground, by cuting through the furrow, and much closer to the corn, than it is possible with any other instrument I have used, leaving the vegetable surface, turned down in the ploughing, in the same position throughout the season, which affords, to the roots of the corn, the best soil for nourishment, in whatever direction they may be extended.

'At the season of big-hilling (in the technical language of Pennsylvania) I give my corn a similar course, with the same machine, but with small shovels, resembling that of the shovel-plough, introduced into the places before occupied by the coulters; when the dressing is ended.

'It remains only to give you some description of my corn-machine, and to state to you my reason for adopting this method of raising corn, and the consequent advantages.

'The frame of my harrow is perhaps no way materially different from that of the common triangle corn-barrow; the sides about four and a half feet long, with a spread that places the two back teeth forty-two inches apart. The whole number of teeth is seven; the front tooth in the centre, and the others three aside, at equal distances. A light piece of scantling is framed into the sides, in front of the back teeth, for the purpose of strengthening the frame and supporting the handles. The coulter-tooth is about ten and a half or eleven inches below the timber, forming such angle with the shank as to give the coulter that direction best calculated to penetrate the ground and perform the office intended. The shovel-tooth, below the shank, is about six inches in length, and four and a half in breadth, projecting in that position best adapted for cuting grass or weeds, and generally for cleaning and mellowing the surface. The shanks of each are fited to the same hole and fastened with a screw on the top; the coulter-tooth must be supported with a considerable shoulder behind; otherwise it would be bent back, the resistance being so great as to produce a sufficient draft for two Horses. With the shovel-teeth, one Horse can travel with ease.

'The farm, on which I have used this machine, I purchased, in a very exhausted state, about fifteen years ago; and, designing to improve it with lime, I deemed it of importance to retain the lime (which I have uniformly introduced with corn-crop) as much on the surface as possible, for the first year. This would not have been the case, if the plough had been used; and perceiving that the raising of corn, in the usual way, exposed the soil to wash, my object was to prevent this injury by reducing the surface to a perfect plane, having neither hill nor furrow.

'I have uniformly found that the coulter-harrow prepared the ground to imbibe and retain a greater quantity of rain-water, than in any other way; in addition to this advantage, that a much less surface is exposed to evaporation, than if the land had been ploughed into ridges, which in a season of drought affords a decided advantage; as in the year 1808 I had nearly forty* bushels to the acre, when land of the same quality, in my neighborhood, farmed in the usual manner, had not half that quantity.

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* My Son informs me that the crop of 1808 exceeded forty bushels to the acre.

'I have tried both Fall and Spring-ploughing, and am inclined to prefer the latter, as I have generally found that, by midsummer, the sod was as well roted in the one as the other, and have experienced much less trouble from the rising of grass, than when the ground was ploughed in the Fall.

'The farm is a thin gravelly loam, with a mixture of clay; and, being in a progressive state of improvement, I have not planted corn a second time, in the same field, subsequent to liming. The average crop may be rated at forty bushels per acre; but with a light dressing with stable-manure I have raised sixty. The dung should be turned down in the ploughing.

'In order to be somewhat particular in the account I have given you, I may, perhaps, have failed in rendering the description sufficiently intelligible; but you will please to accept it as it is, with my wish that the method I have practised may be tried by others; as I believe a saving of labor would not only be gained by its adoption, but also an increase of crop, from ten to twenty per cent, and in seasons of drought to a much greater amount.'

INDIAN HEMP (*Apocynum Cannabinum.*) This plant is quite similar to the milkweed, having a similar pod of vegetable silk, but smaller. It differs most essentially from that plant in the superior strength of the coat of its stem.

'I caused (says Mr. *Genet*) to be water-roted a considerable quantity of it, in 1814, and obtained an excelent hemp, as white as snow, remarkable for its strength, which proved to be double that of common hemp.

'Several of my Neighbors (says he) have assured me, that the ropes and yarn made from the fibres of that plant were far superior, for strength and durability, to those made of flax or hemp.

'That sort of apocynum, being perennial, could be cultivated and multiplied with the greatest advantage, and, being more natural to low and overflowed lands, could render profitable certain pieces of ground which are now totally unproductive.'

This plant, 'growing in its natural state, on swards and in bogs, is lower than the milkweed; but, cultivated, it would probably grow larger, and liberally reward the attention paid to its improvement.'

Mr. *Genet* also supposes its leaves to be equally useful, with those of the milkweed, for the purpose of dying.

See MILKWEED.

INDIGO. Three species of this plant are cultivated; the Wild *(Indigofera argentea)* the Gautimala *(dispermea)* and the French *(tinctoria.)* The first-mentioned is the hardiest plant, and affords the best blue; but one of the other two species is commonly prefered, as being more productive; and of these, the French surpasses the Guatimala in quantity, but yields to it in fineness of grain, and beauty of color.

Indigo is a tap-rooted plant, will endure severe drought, and is unsuitable for wet lands. In the Westindies, it may be raised in poor dry soils; but to most advantage in those which are rich. In the Southern States, however, it requires a good soil. The more southerly parts of our territory are tolerably well adapted for the culture of this plant; but it is more productive farther to the South, particularly in many of the Westindia Islands, where it is indigenous. A bushel of the seed of this plant is sufficient for five acres.

The ground is first to be properly mellowed with the plough, and then harrowed, when the seeds may be sown with a drill, in rows, at the distance of about twelve or fourteen inches apart, in a manner very similar to that which is directed for the culture of onions.

See ONION.

And the intervals between the rows are to be kept clear of weeds, until such time as their further growth will be prevented by the growing crop covering the ground.

It is to be sown as early in the Spring as the ground can be properly prepared; and, when the plants are in full blossom, they are to be cut off a few inches from the ground; when a new growth will come to maturity for cuting, as before directed, which, in this Country, is all that can be expected as the product of a season.

In the Westindies, the plants are cut three, and sometimes four, times in a season; but each succeeding cuting is much less in product than that preceding it. The culture of the crop is to be renewed every Spring, and a sufficiency of the first growth is to be left standing for a supply of fresh seed.

After each cuting, the next process is the manufacture of the indigo, which would seem to be much the most difficult operation.

We shall not describe the method formerly pursued for obtaining the pulp, of which the indigo is composed, from the plants; as the frequent failures in this part of the business, together with the mortality occasioned by the miasma produced by the operation, have greatly discouraged many from embarking in the culture and manufacture of indigo:

We shall therefore merely insert the directions of Dr. *Roxburgh*, for extracting the coloring matter from the plants.

'By the scalding process (says he) I have always, on a small scale, made from the common indigo plant better indigo, than I could by fermentation (the old method) and in one-fourth of the time; and, what is also of great importance, without the smallest degree of that pernicious effluvia, which attends the manufacture of indigo by fermentation.'

He further observes, in substance, that the Hindoos, of the northern Provinces of Indostan, make all their indigo by boiling the plants, and precipitating the pulp or coloring matter with a cold infusion of the bark of the jambalong tree: Yet, says he,

'Notwithstanding the inferiority of this bark, as an astringent, when its effects are compared with those of limewater, I have always found their indigo of an excelent quality, and very light; a cubic inch weighing only about one hundred and ten grains, and being of a blue violet-color. The superior quality of this indigo must alone be imputed to the nature of the process by which the color, or rather the base of the color, is extracted from the plant.'

'Besides the superior quality of the Indigo obtained by the scalding process, the quantity is generally increased by it: Moreover, the health of the Laborer in this way is not endangered, as in the fermenting process, by constant and copious exhalations of putrid miasma. The heat employed expels most of the fixed air during the scalding, which renders a very small degree of agitation, and very little of the precipitant, necessary. The operation can also be performed two or three times a day, upon a large scale; and the indigo dries quickly, without acquiring any bad smell, or putrid unwholesome tendency.'

After the boiling or scalding has been properly executed, the liquor is to be drawn off, and is then to be agitated or churned,

See CHURN,

Until the coloring matter begins to granulate, or float in little flakes on the water; and when this curdling or coagulation has been completely effected, which is usually done in about fifteen or twenty minutes, a strong impregnation of limewater, prepared in a vat for the purpose, is gradually to be added, not only to promote the separation, but likewise to fix the color, and preserve the matter containing it from putrefaction.

In the operation of churning, particular care must however be taken, not to exceed, or to fall short of, the proper degree of agitation; as too little of this will leave the indigo green and coarse; while too much will give it almost a black color. When the proper degree of agitation has been given to the liquor, the coloring-matter changes, on adding the limewater, from a greenish to a fine purple color, which is the hue most proper.

After these operations, the curdled pulp is left undisturbed till it settles to the bottom, when the water above is drawn off, and the indigo is put into small linen bags to drain; after which it is put into little square boxes or moulds, and dried gradually in the shade, which finishes the manufacture.

The boiling or scalding of the plants, for obtaining the coloring matter, may be performed in a wooden vat, made for the purpose, by the aid of steam, in the manner now commonly practised in distiling.

Mr. *Edwards*, in his history of the Westindies, a work whence we derive most of the foregoing information on this article, says, that although the culture and manufacture of indigo held out great prospects of gain to those embarked in it, still the business was mostly given up; owing, as it would seem, to the difficulties and unhealthiness attending the old fermenting process for obtaining the coloring matter.

It would seem, however, that the scalding process, as above described, is calculated to obviate these difficulties, and to render the business profitable.

In the Westindies, it is found necessary to change the ground for rearing this plant every year; as the second year's crop, on the same ground, is liable to be destroyed by grubs, which, when changed into winged insects, prey on the leaves of the plant.

Changing the ground for the crop is found necessary in the Southern States, as the ground soon fails for the culture, where it bears the plant yearly.

We have thought proper to direct the drill-culture, for commiting the seeds of this plant to the earth, as being much the cheapest method.

In the Westindies, it is performed by diging trenches two or three inches deep, with the hoe, droping the seeds by hand, and then covering them lightly with the hoe.

We, however, see no necessity for trenches being thus made, as the beds for the seed; but, if they are requisite, they may be readily made with the scraper, described under TURNIPS; and then the seeds may be laid and covered, in the bottoms of the trenches, with the drill.

INOCULATING, OR BUDING. This, says *Forsyth*, is the best method of grafting most kinds of fruit, particularly stone-fruit.

He observes that this operation is best learned by practice; but gives directions for performing it, as follows: Provide a sharp penknife, with the end of the handle flat for raising the bark; prepare your slips intended to be inserted; choose a smooth part of the stock, five or six inches above the ground, for *dwarfs;* for *half-standards*, about three feet; but for *standards*, about six feet; cut horizontally across the stock about an inch in length, and from that slit the bark downwards about two inches, so as that the incisions be in the form of the letter T; but be careful not to cut so deep as to wound the stock.

After having cut off the leaf from the bud, leaving the foot stock remaining, you make a cross cut about half an inch below the eye, and with your knife slit off the bud, with part of the wood to it, in form of an eschutcheon; pull off with your knife that part of the wood which was taken with the bud, observing that the eye of the bud be left; for those that lose their eyes in striping should be rejected.

Then, having gently raised the bark of the stock, insert the bud; place it smooth between the rind of the stock and the wood; and, having fited it in as exactly as possible, wind the whole closely round with bass-mat made soft by soaking in water (soft ropeyarn will perhaps answer as well) begining at the under part of the slit, and proceeding to the top, minding not to bind round the eye of the bud, which should be left open.

In three or four weeks, you will perceive which have taken, by their appearing fresh, and then the bandages round these should be loosed. In April following, cut off the stock, sloping, three inches above the bud; fasten the shoot proceeding from the bud to the stump of the stock for the ensuing season, and the next season take off that stump close above the bud.

The time for inoculating is, from the middle of June to the middle of August, or rather at the time when the bark raises easily, and the buds will come off well from the wood. The most general rule is, when you observe the buds formed at the extremity of the same year's shoots; for then they have finished their Spring-growth. Cloudy weather, and mornings and evenings, are the best for the operation.

Forsyth says, the slips or cutings to be used for buding should not be thrown into water. He adds, that all trees of the same genus, which agree in their flavor and fruit, will take upon each other. All the *nut-bearing* trees will therefore grow on each other, and the same may be observed of all the *plumb-bearing* trees, including the almond, peach, nectarine, apricot, &c.

To the foregoing directions, which are also those of Mr. *Miller*, Mr. *Forsyth* has added drawings, which are calculated better to explain the process of inoculating.

INSECTS. Immense numbers of these prey upon the labors of the Farmer, against the ravages of which it is, in many instances, difficult to provide adequate remedies. Such, however, as have been discovered, shall be noticed, as something is said of the different kinds of those insects which are found most troublesome.

Some vegetables are offensive to all insects; such as the elder, especially the dwarf kind, the onion, tansy, and tobacco, except to the worm that preys on that plant. The juice of these may therefore be applied, with effect, in repeling insects; and sometimes the plants themselves, while green, or when reduced to powder, particularly the latter, when made into snuff.

Set an onion in the centre of a hill of cucumbers, squashes, melons, &c. and it will effectually keep off the yellow striped bug, that preys upon those plants while young.

No doubt a plant of tobacco, set in the same way, would answer a similar purpose; or, perhaps, to sow a few tobacco or onion-seeds in the hill, when planting, would have the same effect; and the growing plants from these seeds could be taken away, when no longer wanted as protectors.

Of other substances, sulphur is perhaps the most effectual, as every kind of insect has an utter aversion to it.

Powdered quick-lime is deadly to many insects, and perhaps offensive to all.

The same may be observed of soot, wood-ashes, and other substances which are strongly alkaline; and also of common salt finely powdered, brine, old urine, &c.

Calomel is also deadly to insects; and camphor, and terebinthine substances, are offensive to them.

After premising thus much, we shall now speak of insects separately, and begin with the

CANKERWORM. The female of this insect comes out of the ground very early in the Spring, and ascends the tree to deposit her eggs, which she does in suitable places in the bark; where they are brought forth, and the young brood live on the leaves of the tree.

The only effectual remedy is, to prevent the insect from ascending the tree; and this may be done in various ways; but the easiest, perhaps, is as follows:

First scrape off the shaggy bark round the body of the tree, to the width of two or three inches; then make up a mixture of oil, or blubber, with suitable proportions of sulphur and Scotch snuff; and with a brush lay this on the scraped part, forming a ring round the tree an inch or two wide; and no insect will ever attempt to pass this barrier, as long as the composition has any considerable moisture left in it.

Let it be repeated when it inclines to harden; though perhaps this is not necessary. Let it be done early in the Spring, before the insect comes from the ground.

Another method, which it is believed will be found equally effectual, though attended with more trouble, is to scrape off the shaggy bark from the body of the tree; and then whitewash that part well with lime and water and a little sulphur added.

In place of this, however, Mr. *Forsyth* directs that the body of the tree be covered with a composition of *old* urine, kept some time for the purpose, soapsuds, and fresh cow-dung; and this he says will keep off all insects. Let it be laid on plentifully.

Another method, we have heard recommended, is to fasten a strip of sheepskin, with the wool outwards, round the body of the tree, taking care that no place be left for the insect to creep up between the strip and the bark. The wool should be frequently combed to keep it loose.

A streak or ring of tar made round the body is also effectual, as long as the tar remains soft; but, as it soon becomes so hardened on the exterior, that the insect can crawl over, it requires to be repeated very frequently. Perhaps such a ring of tar and oil, or blubber, mixed together, would answer better.

Lastly, a strip of oiled paper put round the tree, with the lower edge projecting out considerably, forms a barrier which the insect cannot pass. Let the lower edge of the paper be kept well oiled.

In regard to all insects which are injurious to trees, by climbing them, and commiting depredations upon them, in various ways, we believe, from the most correct information we have been enabled to obtain, from various sources, that, by taking the earth away from the roots of the trees, very early in the Spring, and destroying whatever may appear to be the abode of any insects; and then returning the earth back, mixed with a small quantity of sulphur, sprinkling some of this upon the surface, will keep every insect from ascending any such tree.

The effect of sulphur, for this purpose, is very durable. Probably one operation of this kind will last for several years; though, on this point, we have no particular information. Other repelants of insects may be found repelants only for a time, more or less limited; but perhaps may answer the purpose for one Spring; such as quick-lime, fine salt, old urine, strong soapsuds, a strong decoction of tobacco, onions, &c. &c. Let either of the four lastmentioned ingredients be applied, boiling hot, to the roots, after first taking the earth away, as before mentioned.

Curculio. This is a bug, about the size of that which eats into the pea, and has proved very troublesome to most of the smoothskined stone-fruits, and even to peaches, apples, and pears, in different parts of the country contiguous to Philadelphia. It has also made its appearance about Albany.

It ascends the trees in the Spring, and as the fruit advances it makes a wound in the skin, and there deposits the embryo; from which a maggot is first produced. This preys upon the fruit until it dies and falls off; when the maggot makes its way into the earth, and is there changed into a bug, which is ready to ascend the tree the next Spring, and make its deposit in the fruit, as before.

One method of keeping this and all other insects from trees, as practised by Col. *Nichols*, near Easton, is to tie a small bag of common salt round the tree. A ring put round the tree, of a mixture of grease, or blubber, mixed with salt, and some of the other ingredients before mentioned, would perhaps answer a better purpose, and be attended with less trouble.

A recipe of his, which he says he has practised on peachtrees with advantage, in regard to their health, is:

"Take away the dirt from around the root, and where you find gum issuing out, there you will also find a white maggot, which is carefully to be taken away; then wash the body and roots with strong brine, which you will repeat now and then, in the Spring and Summer."

We will mention two other methods, which are said to be infallible, for keeping all insects from trees: One is, bore a hole in the body of the tree, and fill the hole with mercurial ointment (*unguentum coeruleum*) and cork it up tight.

The other is, bore a hole in the north side of the body of the tree, and fill it with spirits of turpentine, and cork it up, as before. Where the latter article is put into the hole, it should be bored slanting downwards, to keep this liquid from runing out before the cork can be put in.

If these remedies are effectual, and we have considerable confidence in them, it must be owing to the essence of either of these substances becoming diffused throughout the tree, and thus rendering it noxious to insects.

Caterpillars. The above directions, for keeping Cankerworms from trees, are equally applicable to these insects.

When a nest of these is formed, run a pole into it, twist it round till the nest and its contents are wraped round the pole, and bring the whole down and kill the worms. Let this be done early in the morning, when the worms are all in the nest. If any escape this operation, repeat it when they have rebuilt the nest.

Where the nests have been suffered to remain till the insects have left them, young broods for the ensuing year will, the next Spring, be found on the trees in the chrysalis state, under the shelter of a dry curled leaf or two, bound with filaments like cobwebs. These should be searched for and destroyed.

It is said that Caterpillars will take shelter under woolen rags, when put on trees where they resort; from which they can be easily taken and destroyed.

GRUBS. Large maggots produced from the eggs of a species of the Butterfly, very injurious to Indian corn, while young, by eating the roots. Frequent ploughings, manuring the land with lime, soot, ashes, or salt, all tend much to keep them out of the soil.

Most of the articles before mentioned, as being offensive to insects, either boiled in, or diluted with, water, and that applied to the hills, especially just before a rain, will quickly drive the Grubs away.

TOP, *or* SPINDLEWORMS. White worms, resembling Grubs, found in the central hole which is formed by the leaves of Indian corn; and they there eat off the stem which forms the top of the plant. They are mostly to be found near barnyards, and in rich spots. They are discovered by their excrement appearing on the leaves. Sprinkling the corn with a weak lye of wood-ashes will extirpate them.

BLACKWORMS. Ash-colored worms, with black stripes on their backs. When full grown, they are of the thickness of a goose-quill, and about an inch and a quarter long. They hide in the soil by day, and commit their depredations by night. They eat off young plants above ground, and frequently endeavor to draw them under. It is said that manuring the ground with salt will drive them from it, and that lime and ashes will also have nearly a similar effect.

REDWORMS. These are slender, about an inch long, with a hard coat, and pointed head. They eat off wheat, barley, and oats above the crown of the roots; and they also eat through turnips, potatoes, &c. No adequate remedy is known, unless it be manuring with the manures before mentioned, which are offensive to all insects. Summer-fallowings are also recommended, as depriving them of their requisite food.

Palmerworms. About half an inch in length, with many legs, and very nimble. They give to appletrees the same appearance that the Cankerworm does. Mr. *Dean* says, that great numbers of them appeared, in the year 1791, in Cumberland, Massachusetts, and ate off all the leaves of the trees, except the membraneous parts; but that next year they disappeared. They let themselves down from the trees by threads, similar to the Spider. No remedy known.

Timberworms. The smaller kind merely eat into the sap of wood, and turn it into powder-post, as it is commonly called. Felling timber about the middle of Winter, the time it has least sap in it, will obviate this difficulty.

The large Boringworm takes its residence chiefly in pine timber. They are hatched in the cavities of the bark; and being small, when they enter the wood, they grow larger as they proceed, till their boring may be heard at a considerable distance. If the trees be scorched in a light flame, says Mr. *Deane*, or steeped in salt-water, it will destroy these worms, or prevent their entering the wood.

The same Author also makes mention of formidable armies of worms which, in the year 1770, overran the county of Cumberland, about the middle of July. They striped the vegetables of their leaves, leaving only the stems; were extremely voracious; moved in apparent haste, and all in the same direction; crawled over houses, &c. unless they found an entrance. Other parts of the Eastern States have since experienced their ravages.

The best security found against them was, to stop their course by trenches, having their sides leaning over, out of which they could not climb, after they had got into them.

Hessian-fly. Well known for its ravages in wheat. Remedy: Immerse the seed-wheat ten or fifteen seconds in boiling-hot water; cool it suddenly; dry it, with lime or gypsum sprinkled upon it, and sow it immediately. This process will assist its growth, in addition to its killing the nits of the fly, which, by a good glass, are said to be discernible near the sprouts of the grains that are infected. This remedy stands well attested by several publications, and is believed to be effectual.

This insect appears to be now on the decline, and its duration will probably be found to be temporary. Though we have given it a German appellation, it is very doubtful whether it ever was known in Germany or any other part of Europe.

Maggots. Troublesome to the roots of cabbages, turnips, and radishes. Give the ground a previous manuring with salt, which it is believed will be found effectual.

Some weak brine applied to the roots of the plants, just after a rain, is also recommended. It should not be too strong, lest it injure the growth of the plants.

Yellow-striped Bug. Formidable to the young plants of cucumber, &c. In addition to what has already been said, of the remedies for keeping off these intruders, we would recommend sprinkling the plants with a little sulphur, or Scotch snuff, which it is believed will be found equally efficacious.

We have understood, also, that sprinkling the plants with gypsum has been found to answer an excelent purpose, as well for keeping off the insect as for manuring the growing plants.

Turnip-fly. This insect eats the seed-leaves of the young turnip-plants, and thus destroys them. One remedy is, to sow the ground with a mixture of old and new seed, and, as these will come up at different times, a part of the one or the other will stand a better chance of escaping.

Sowing a suitable proportion of tobacco-seed with the crop will, no doubt, answer every purpose, for keeping off this insect. But, as common salt is found to be an excelent manure for this crop, we would recommend about three or four bushels of this article, made fine, with as many pounds of sulphur, and perhaps one or two of Scotch snuff, well mixed together, to be sown on the ground, just as the plants are coming up; and this, we venture to say, will be found effectual in keeping off these insects.

A flock of ducks, let into the turnipfield, is also very good, as they will destroy the insects, without injuring the plants.

Rolling the ground, where it is smooth, is also beneficial, in protecting the crop, as this serves to close up the hiding-places of the insect.

It should be remembered, however, that, where turnips are cultivated extensively, the crop is much less liable to injury, from these insects, than where only small pieces are sown. In the former case, the insects, being the same in number, have a wide extent to feed upon; and therefore do not feed so closely. In the latter, their pasture being but small, they eat all off before them.

Garden-flea. Very destructive to young cabbage-plants, while in the seed-leaf. Remedy: Sow some onion or tobacco-seeds with the seeds of the plant; or, sprinkle some sulphur or snuff on the growing plants. Soapsuds sprinkled over them is also good.

Lice. These infest cabbages, particularly; but are destroyed by the frosts. They are easily extirpated by smoak, particularly that of tobacco.

Weavel. A little black bug, very destructive to wheat, either in barns or graneries. On thrusting your hand into a bin of wheat infested with them, considerable warmth will be felt; but, as they are usually collected together, every part of the heap or bin should be examined.

There are various ways of keeping wheat clear of this insect, after it has been threshed out and put in bins. Mr. *L'Hommedieu* found that a sprinkling of lime with wheat, infested with them, in his bin, soon drove them away. The lime can be afterwards winnowed out.

Sulphur or snuff, put up in little papers, or bags, and properly distributed among the wheat, in the bin, will keep them out, or drive them out when they have got possession.

A plant of henbane has the same effect; and so has the leaves and wood of the lombardy poplar. A bin made of boards of this wood will never have a Weavel in it.

Take wet linen cloths, and lay them over a heap or bin of wheat, with Weavel in it, and they will soon come out of the wheat, and get upon the cloths; when, by diping these in water again, the insects are readily destroyed.

They may also be sifted out of wheat, by a sieve which will let them through and retain the wheat.

It would seem that the readiest way to keep them out of mows of wheat, before threshing, would be to mix little pieces of the lombardy poplar every where through the mow, in laying the sheaves away. Perhaps common salt is as offensive to this insect, as to most others; and, if so, to sprinkle some among the sheaves, when laying them down, might answer the double purpose, of keeping out the Weavel and improving the straw for fodder.

Grasshopers. Prodigious quantities of these are some years generated in upland mowing-grounds. Upland pastures do not produce so many, owing probably to the feet of the cattle destroying many, before they are brought forth. Low wet meadows or pastures seldom produce many of them. The only known remedy against them, and it is sometimes very inadequate, is to destroy them by raising large flocks of Turkies and other poultry, which feed on them.

Lice on Cattle, and **T[illegible]ks**-on Sheep, may be added to the catalogue of destructive insects. Where Colts and young Neat-cattle become lousy, by reason of poor keeping, or otherwise, the Lice are to be destroyed by oiling the creature, or washing it with a decoction of tobacco; and they should have better keeping, to prevent a return of the Lice.

And where a Sheep becomes full of Ticks, which will sometimes kill the animal if not removed, they may be destroyed by a fumigation of tobacco-smoke, as is described under SHEEP.

But the easiest method is, to part the wool of the animal on each side of its spine, from its head to its tail, and drop in some Scotch snuff along in each opening, and this will soon free the Sheep of its vermin. Where it requires immediate relief, however, recourse should be had to the method first mentioned.

See PEACHTREE, for an effectual method, practised by Mr. *Bayley*, for preventing the injuries done by a Worm to that tree, in Virginia.

For destroying the black Bug, that eats into the pea, see that article.

J.

JAUNDICE. *See* OVERFLOWING OF THE GALL, and YELLOWS.

JERUSALEM ARTICHOKE (*Helianthus Tuberosus.*) This is a hardy perennial plant, with a large bulbous root. The stalk grows to a considerable height. It is cultivated by the roots, in the manner of potatoes. The roots are particularly useful for feeding Swine, when boiled, and are said to be very productive. One Cultivator found its produce to be about four hundred and eighty bushels to an acre, without manure. Another raised between seventy and eighty tons from an acre. They will grow well in almost any dry soil, even if it be poor. When cut, and ground in a cidermill, they make good food for Horses, with the addition of a little salt. Mr. *Legaux*, of Springmill, Pennsylvania, raises this root from Dutch seed, and has had them eight and nine inches in diameter. He says they are easily kept through Winter in the ground, nothing being requisite further than to dig a trench round them, to prevent the water injuring them.

K.

KILLING of BEASTS. But little need be said on this subject, as butchering is only to be learned by practice. But the cruel manner in which butchering is often performed is deserving of some animadversion. The killing of beasts for our use is lawful; but surely it is not so to torture them. He who, in the act of taking the life of an unoffending creature, deals not the stroke of death with mercy, must either have become callous from inveterate habit, or in feeling must be of little higher grade than the animal against which his hand is raised.

It is believed, however, that there is a right and a wrong time for killing Neat-cattle, Swine, and Sheep. The right time, allowing them to be well fated, is when their meat shrinks the least in boiling; and the wrong, when it shrinks most. Some say the former is the case during the increase of the moon; and the latter, during its decrease.

That this planet has its effect on the bodies of animals, may readily be believed, from the mere circumstance of lunacy among Men.

It would be well to make some accurate experiments, to ascertain the truth of this matter, by having animals, intended for butchering, killed at different times; say, at the full of the moon, at its change, during its increase, and its decrease; and then, by boiling a given number of pounds of the same parts of each together, and weighing each separately after boiling a given time, the result would be tolerably conclusive, as to the right time of killing. The experiment should be repeated, if the first was not conclusive.

L.

LAMPAS. An excrescence in the roof of a Horse's mouth, which hinders him from feeding. Young Horses are most liable to it. The usual cure is, applying a hot iron to the swollen part. Mr. *Gibson* says that care must be taken, not to penetrate so deep as to scale the bone that lies under the upper bars of the mouth, as this would be very injurious to the animal.

Mr. *Peters*, of Pennsylvania, after remarking that lampas is caused by fever in the Horse, and that the swelling should be allayed by reducing the fever, says that he never would suffer a Horse to be burned in the mouth, as he had known them to be ruined by repetitions of this operation. Sometimes a mess or two of hard Indian corn, he says, banishes the swelling.

LAYERS. Trees and shrubs that yield no seed in this climate, and which cannot be propagated by slips or cuttings, may nevertheless be propagated by layers. The manner of doing it is as follows: Take shoots of the last year's growth, bend them to the earth, and burry them half a foot deep in a good mellow soil; fasten them with hooks to prevent their rising, and bend the tops so as to bring them above the surface. A slit upwards should be made in that part of the twig which lies deepest, or a wire drawn tightly round it there, to prevent the sap from mounting too fast. Let the ground be covered to keep it moist, and let it be watered if necessary. When the twigs have struck root, they may be cut off in the Spring and transplanted into the nursery.

The time for laying evergreens is July or August, and October for deciduous trees. Many herbaceous plants may also be propagated in this way.

LICE. *See* Insects.

LIMESTONE. *See* Earths.

LOAM. *See* Earths.

LOCUST (*Robina.*) This is a very valuable tree for cultivation, as it will grow well on any poor barren sandhill, and indeed in every kind of dry soil, where the climate is not too cold. A sandy loam or gravelly loam is best suited for it. It will cause grass to grow on the poorest soil; so that ground planted with these trees answers the double purpose of forest and pasture. The trees will acquire a very considerable size in fifteen years, and in about twenty-five years are full grown.

The timber is excelent for the trunnions and knees of vessels, for cogs for mills, and for many other purposes, where hardness and durability are required. For posts for fences, it will last fifty or sixty years, and for firewood it is also excelent. On the whole, considering all the good qualities of the locust, it may be accounted the most profitable which the Farmer can cultivate.

See FORESTS, for an easy method of cultivating this tree.

It is said that immersing the seeds of this tree for half a minute in boiling-hot water, and then cooling them before planting, will make them sprout very suddenly, and grow two feet high the first year.

LOMBARDY POPLAR (*Populus.*) This tree acquires its full size in about twenty years; by which time it will contain half a cord of wood. It is grown at present merely for ornament; but, when firewood becomes necessary to be planted, probably this tree may be thought worth cultivating for fuel. It will not, indeed, make fuel equal in quality to that of the locust; but, as it grows faster, its inferiority of quality may perhaps be compensated by the rapidity of its growth. It must, however, be dried before it will be fit for fuel, as in its green state it will not burn to any advantage. It is easily raised from slips or cutings, and will grow on almost any soil.

In France and Italy, this tree is cultivated and trimed up for beams and other timber for buildings; but probably it will grow larger in those countries than in this State, as the climate there is more friendly to its growth.

LUCERNE. *See* GRASSES.

M.

MADDER (*Rubia Tinctorium.*) The following directions for raising this plant are copied from '*The Emporium of Arts.*'

'This plant may be propagated, either by offsets or seeds. If the latter method is prefered, the seed should be of the true Turkish kind, which is called *lizari*, in the Levant. On a light thin soil, the culture cannot be carried on to any great profit. The soil in which the plant delights is a rich sandy loam, being three feet in depth or more.

'The ground, being first made smooth, is divided into beds four feet wide, with alternate alleys half as wide again as the beds. The reason of this extraordinary breadth of the alleys will appear presently. In each alley is to be a shallow channel for the convenience of irrigating the whole field, &c. That part of the alley which is not occupied may be sown with legumes.

'The madder-seed is sown broadcast, in the proportion of from twenty-five to thirty pounds per acre, about the end of April. In a fortnight or three weeks, the young plants begin to appear; and, from this time to the mouth of September, care must be taken to keep the ground well watered and free from weeds.

'If the plants are examined in Autumn, they will be found surrounded with small yellow offsets, at the depth of two inches; and early in September the earth from the alleys is to be dug out, and laid over the plants of madder, to the height of two or three *feet.** With this the first year's operation ceases.

'The second year's work begins in May, with giving the beds a thorough weeding; and care must be taken to supply them with plenty of water, during the Summer. In September the first crop of seed will be ripe; at which time the stems of the plants may be mown down, and the roots covered a few inches with earth, taken as before out of the alleys.

'The weeding should take place as early as possible in the Spring of the third year; and the crop, instead of being left for seed, may be cut three times, during Summer, for green fodder; all kinds of cattle being remarkably fond of it.

'In October the roots are taken up, the offsets carefully separated, and immediately used to form a new plantation; and the roots, after being dried, are sold, either without further preparation, or ground to a coarse powder, and sprinkled with an alkaline lye.

'The roots loose four-fifths of their weight in drying; and the produce of an acre is about two thousand pounds weight of dry saleable madder.'

Madder usually sells for about thirty-two dollars per hundred; so that the produce of an acre, as above stated, would amount to six hundred and forty dollars.

MANGEL-WURTZEL (*Beta Altissima.*) There are varieties of this species of the beet, some of which are more productive than others. Mr. *Peters* says those of a rosecolored skin, with the interior solid and white, not laminated and mottled, like the common beet, are the best. He says it is better than the common beet for the table; and that its leaves while young are, for this purpose, fully equal to the Spinage.

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* *Inches*, we suspect it should be, instead of feet.

He gives a preference to this root, having tried all others, particularly for fating Neat-cattle, Sheep, and Store-hogs; and says that to some Horses it is grateful and nutritive, though some refuse to eat it.

See Pumpkin, for a method of learning any Horse to eat that food, which no doubt will answer equally well for this.

The leaves, he says, which are very abundant, are superior to any other green herbage, now in common use, both in quality and quantity, for soiling.

See Soiling. But *see* also Guineagrass.

They may be frequently striped off during the season, leaving the heart-shoots, or leaflets, and the roots will, on this account, grow the better. Some mow them off, taking care not to cut too close to the roots.

Mr. *Peters* cultivates this root, with success, on loamy land, with some mixture of sand in it. The land was formerly trench-ploughed. Rich, deep, loamy soils are properly adapted to its culture; and on such, we think, there can be no doubt of its being more profitable to cultivate than any other root, especially when the leaves are used for soiling.

Steamboiling the roots renders them more nutritive and efficient for the purpose of fating cattle. Those which are stored for Winter and Spring-use must be protected from frost; though, if they should become frozen, they may be used for cattle, before they have thawed, by extracting the frost from them in water, in the manner directed for turnips.

See Turnip.

The roots should not be stored away, until the moisture on the exterior part has been dried: They may then be kept in dry sand, to protect them from frost; or they may be kept without sand, in a place sufficiently guarded against frost, as described under Turnip; in which way they will remain fresh and sound, as long as they are wanted for the Winter and Spring supply.

Having observed thus much, on the culture of this excelent root, we shall give the Reader an extract from the third Volume of the 'Memoirs of the Philadelphia Society for promoting Agriculture;' which we presume will be found sufficient to teach the Inexperienced the proper mode of culture, and to convince every one of the superior excelence of this root.

[The following account of methods used in the cultivation of the improved *beetroot*, or mangle wurtzel, is taken from a recent publication by Mr. *Pinder Simpson*, of the county of Essex, England, 1814.* Experiment must decide to what degree these statements will apply to the culture of this root in our Country.

Fifty tons have been raised on an acre, in England. The produce of one-tenth of an acre will keep a Bullock *fating*, fourteen weeks. Dry fodder must accompany this green food. The produce of six acres will faten sixty Bullocks; allowing each one hundred pounds per day; as appears in the statements made in this publication.

1. In broad-cast, on strong land, spade-trenched, ten inches deep, leaving the plants after hoeing nearly fifteen inches apart each way. Produce, per acre, fifty tons.

2. Transplanted in rows, three feet apart, the plants eighteen inches apart in each row. Produce, per acre, twenty-two tons.

3. Dibbling the seed, in rows two feet apart, and the plants left twelve inches apart in each row. Produce, per acre, forty-eight tons.

By these different methods, results will prove which is preferable. Its great advantages over turnips are shown in every way, as well on account of the beet being more nutritious, as its not being subject to the fly, or other annoyances to turnip-crops. Nor is the expense of cultivation so great.]

For the information and guidance of those Occupiers of land, who may be desirous of cultivating the improved beet-root upon strong land, the next chapter will contain a particular account of the method used in cultivating that root upon strong land at Bedfords. The method there stated, is that which has been found, on three years' trial, to be least expensive in the begining, and most profitable in the end. The cultivation of this root is earnestly recommended to the attention of all Persons farming strong lands with a view to profit. It should never be forgoten, that forty-eight tons, the produce of only a single acre, of this root, will make ten Bullocks fat enough for the Butcher; and that six acres, of equal produce, will faten sixty Bullocks; that the profit on each Bullock will be considerable; and that, when the business of feeding is over, the yard will be full of rich dung: Neither should it be forgoten, that the Tenant, who sells his straw, cannot partake of any of these advantages.

In proof of this assertion, the following facts are submited for consideration:

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* The advertisement prefixed to the book states, that the observations were made upon crops of the root grown upon a farm at Bedfords, in the county of Essex, containing six hundred acres, belonging to *John Heaton*, Esq. and in his own occupation.

Mr. *Heaton* bought two lean Welch Bullocks, at Harlow-bush fair, on the 9th of September. They cost together thirty-four pounds. They were pastured on the Rowens till the 20th of November following, when they were tied up, and fed with beetroot and oat-straw till the 9th of February following; when they were sold together, in Romford market, for the sum of fifty pounds; yielding, in twenty-two weeks, a profit of sixteen pounds, which is equal to *7s. 3d.* per week, for each Bullock

These two Bullocks were tied up twelve weeks each, in which time they ate eight tons, two hundred weight of beetroot, the produce of only one-sixth part of an acre of land, cultivated according to the method recommended in the following chapter.

The method used in the cultivation of the improved Beet-root, upon strong land, at Bedfords.

It may be proper, in the first place, to state what is meant by strong land. The surface-soil is loamy, and from four to twelve inches deep, upon a bed of strong clay mixed with gravel. It is too heavy, and generally too wet, in the Winter, even for Sheep to eat a crop of turnips on the ground; and, although good turnips are grown upon it, it is always necessary to draw them for the Sheep, stallfed cattle, or for cattle in the yards. The ground is prepared to receive the seed, and cleaned, in the same way as it would have been for Swedish turnips. As that part of the business is so well known to all Farmers, it is not necessary to enter into detail upon it.

In the middle, or latter end, of the month of April, the furrows are set out with the plough, two feet apart, and double-ploughed; that is, the plough returns on the furrow to the point whence it set out, forming a ridge between the furrows.

Double-ploughing with a common plough is prefered to single-ploughing with a double-mouldboard plough, because it affords a greater depth of loose earth than the double-mouldboard plough would produce.

In these furrows, the manure, which should be in a roten state, is deposited, after the rate of six cubic yards to an acre.

The ridges are then split by the plough going and returning the same way as before mentioned, leaving the manure immediately under the middle of the new ridges. A light roller is then passed along the ridges, in the middle of which the seed is dibbled, so that the plants may receive all the benefit which can be derived from the manure.

The seed is deposited about an inch deep, whilst the moisture is fresh in the earth, and covered by drawing a garden-rake along the rows.

After this, the light roller is again passed along the ridges, and the work is finished.

When the plants are about the size of a radish, they are hoed with a turnip-hoe, leaving the plants in the rows about twelve inches apart. If any of the seeds fail, and there happen not to be an even crop, the roots, where they are too thick, are drawn out before the hoeing takes place, and transplanted, to fill up the vacant places, and insure a full crop, which is always certain; inasmuch as ninety-nine plants, out of one hundred, thrive and do well. In transplanting, care is necessary to prevent the point of the root from turning upwards.

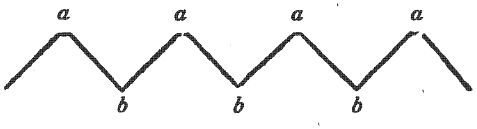
The weeds, whilst the plants are young, are kept hoed; but, after the head of the plant has once spread, no weed can live underneath its shade, and the expense of hoeing afterwards is very trifling indeed.

The whole of the crop is taken up in the month of November, in dry weather. The tops are cut off *near* the *crown* of the plants, and the plants, when perfectly dry, are piled up in a shed, and covered with straw sufficiently thick to preserve them from the frost. They kept last year till the latter end of March, and they would have kept much longer.

The seed may be had of *Cochran*, Seedsman, in Duke-street, Grosvenor-square, and of Messrs. *Gibbs & Co.* Half-moonstreet, Piccadilly. From three to four pounds of the seed will be sufficient for an acre of ground, prepared and dibbled according to the method here stated. The price last year was seven shillings per pound; but it may probably be less hereafter, as the Growers of the root, so long as that high price continues, will of course save their own seed, and thereby lessen the demand from the Seedsman.

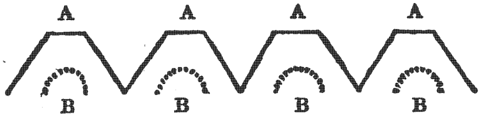
THE METHOD BEFORE DESCRIBED ELUCIDATED.

Form of the Ridges before manuring.



The tops of the ridges, about two inches broad, *a a a a*.
Intervals of twenty-four inches from one *a* to another.
Depths about twelve inches from *a* to *b*.
Furrows where the manure is deposited, *b b b*.

Form of the Ridges after spliting and rolling.



Tops, A A A A, nine inches broad, in the middle of which the seed is deposited.
Situation of the manure, B B B. B.

It will not be supposed, by any intelligent Farmer, that, where the quantity of the improved beetroot given daily to a Bullock is stated, it is meant that it should be given without dry food. It may, however, be necessary to say, that the same dry food must be given with the beet as is usually given with turnips. Mr. *Heaton* last year gave oat-straw only, and the Bullocks did well upon that food, and were sold to profit. No doubt they would have been ready for the Butcher sooner, had good hay been given to them: But this fact may be relied upon, that fresh Bullocks, fed upon the beetroot and oat-straw, will, in three months time, get fat enough for the Butcher.

It may also be necessary to observe, that not a word, here stated, is intended to apply to such light turnip-soils as will bear the trampling of Sheep, without injury to the land. Mr. *Heaton* has none upon his farm; and I have not sufficient knowledge of the management of turnip-land, of that description, to say, whether prudence would warrant any trial of the beetroot, upon a large scale, on such soil, to be eaten on the land.

Where a field, selected for a crop of beet, happens to be in a foul state, the seed had better be sown in a garden, and the whole field planted with the young beet, when of the size of a radish. This will give time for cleaning the ground, and fiting it for a crop; for, although the beets are destroyers of weeds, it is not meant to recommend sowing them on foul ground, or in any way to encourage a slovenly system of farming.

Although manure has been used in the cultivation of this root, it is not absolutely necessary; and, if not in a roten state, it does mischief. Good crops have been obtained at Bedfords, *without manure*, and without injury to the succeeding crops of corn. Beet is fed from a depth considerably below the reach of the plough, as generally used; so that it does not draw the surface-soil in which corn is fed.

The method of cultivating the beetroot, here recommended, is the same as that which is used in the cultivation of turnips, in Northumberland and other parts of the North, with this exception, that the rows there are twenty-seven inches apart. There may be reasons in the North for still prefering that space; but in Essex the effect of it, in the cultivation of the beetroot, would be, that, instead of forty-eight tons per acre, forty-three tons only would be obtained. Experience has proved, that the roots do not get to a larger size in rows three feet apart, than they do in rows two feet apart. It may, therefore, fairly be presumed, that they would not be larger in rows twenty-seven inches apart; and, if not larger, the weight of the crop, per acre, must be less; because the plants decrease in number as the rows increase in space.

The advantages that would arise from the cultivation of these roots, upon a small part of every strong-land farm throughout the kingdom, must be obvious. Calculations might be given that would astonish, and almost exceed the belief of, most Readers. Such calculations, however, in general, are but little attended to; and it is thought better to omit them; hoping that enough has been said upon the subject to fix the attention of every Person interested in the cultivation of land.

MANURES. A knowledge of the efficacy of different manures, to what soils they are most suitable, and the means of making the most of each, is worthy of the particular attention of the Farmer. Lands are seldom so rich, but it may be a matter of gain to increase their fertility; and few tracts are so poor but, with proper tillage and manuring, they may be made the residence of plenty.

Manures are composed of all those substances which, either directly or indirectly, supply plants with their requisite food, by means of which they are enabled to expand and come to maturity.

See Food of Plants.

In the first place, different earths will serve to manure each other. Thus, clay is a fertilizer of a light sandy soil, and sand is equally a fertilizer of clay. Where clay-lands are in grass, the sand should be laid on as a top-dressing; but where they are ploughed, it should be well mixed with the soil, for the purpose of destroying its adhesion. Sand which has been washed down in roads and elsewhere is best. Where clay is applied to a sandy soil, it should be carted on in the Fall, and spread evenly over the ground, that the frost may pulverize it before it is mixed with the soil in the Spring.

The better these earths are mixed in the respective soils, the more sensible and immediate will be their effects; but their principal excelence is, that they are calculated permanently to improve the soils to which they are applied. Stiff loams are also in the same way assisted by sand, and sand again by these; but neither in so great a degree as in the former case. Generally, it may be observed, that all light dry soils are improved by being mixed with heavy earths, and *vice versa*.

Sand and fine gravel will greatly fertilize the soil of bog-meadows, and this earth again is a very good manure for all upland soils. It is peculiarly excelent for Indian corn, when applied to the hills, and is very good for flax, hemp, and most other Summer-crops. Like gypsum, it is friendly to the growth of white-clover. When applied to upland grasses, it should be laid on as a top-dressing. Every kind of black mud, from ponds and swamps, answers a somewhat-similar purpose; though, if the mud be stiff and clayey, it should only be applied to a light dry soil.

The different sorts of marle found in bogswamps are also excelent manures for all upland soils. These earths are usually found at the depth of from one to three feet from the surface, and are either of a white, gray, or brownish color. The former is the most efficacious, and the latter the least so; their strength being in proportion to the quantity of carbonate of lime they contain. It is best to mix these earths with the mass of black earth, or bogdirt, that forms the upper stratum, in order to reduce their strength; and, when thus mixed, a load of even the weakest kind is more efficacious than two of common barn-dung.

Their operation as manures is similar to that of the Novascotia gypsum, having little or no effect when first applied to wheat, and rye; but, by its afterwards covering the ground with a thick growth of white-clover, it is then rendered fit for producing largely of these crops. The same may be observed of the bogdirt. Like this, too, these marles are peculiarly excelent for Indian corn, and all Summer-grain, and a less quantity is sufficient. They may be used as top-dressings, or otherwise.

The upland marles are good manures for sandy, gravelly, and other dry soils. They are also valuable in proportion to the quantity of carbonate of lime they contain. Mr. *Young* mentions the tract of country lying between Holkam and Houghten, in England, having been converted into good farming-lands, which formerly were so light and poor as to be kept only for Sheepwalks. This was effected by diging up the marle, which was found to lie at some depth underneath, and manuring the soil with it, at the rate of about one hundred loads to the acre.

This kind of marle is merely a clay, with sometimes a mixture of fine sand; having a greater or less proportion of carbonate of lime in it; and the more the better. It is generally of a bluish color, and like other marles is to be known by the effervescence it occasions when droped into vinegar, or other stronger acid. The greater the effervescence the better the marle.

See Henry's Chemistry, for the means of ascertaining how much calcareous earth any marle contains.

Upland marle should be carted out in the Fall, and spread as directed for clay. The other kinds should be thrown up in a dry time in the Fall, and may be carried out in the Winter, or other time when the ground is sufficiently firm for the purpose.

Ashes, as a manure, are found to be more efficacious in some parts of the country than in others; generally most so when applied to lands near the ocean. The Longisland Farmer can afford twelve cents a bushel for even leached ashes; while, in Herkimer county, they are suffered to lie untouched about the potasheries.

Ashes generally answer the most valuable purpose when applied to Indian corn, particularly where the soil is not suitable to this plant. Where the soil is wet, cold, loamy, or clayey, the plants are apt to get stunted by the cold rains which usually fall after planting; and then the ashes serve to supply the natural deficiencies of the soil, till it becomes fertilized by the Summer sun. But, where the soil is natural to the growth of this plant, and there is no danger of its being stunted at its outset, perhaps it may be better to apply the ashes later; so that the plants may derive the greatest assistance from this manure, while the ears are seting and forming.

Ashes should generally be used for top-dressings: Their salts lose nothing by exposure to the air, and soon find their way into the soil.

Soot is much more efficacious than ashes; beside salts, it contains oil. The soot of coal is esteemed equally as good as that of wood. It is used for top-dressings, and requires about forty bushels for an acre. When applied to Winter-grain it should be sown in the Spring; and the same may be observed of ashes. Coal-soot particularly is very good for meadow-lands which have become sour and mossy. This manure can, however, only be had in considerable quantities in large towns.

Of salts, which serve as manures, the principal are the common sea-salt, urine, stale of cattle, seawater, saltpetre, and alkaline salts. To the latter, the virtue of ashes, as a manure, is principally owing. Soapsuds is in part valuable on account of its alkaline salts; and perhaps the neutralized oil it contains adds much to its value. It is usual to throw this manure away; but this is a needless waste. It may be taken in the wateringpot, and strewed over the garden, where it will be of great service as a manure, and in expeling insects.

We shall presently say something further of this, and other manures afforded from the dwellinghouse.

Saltpetre should be dissolved in lye of wood-ashes, in which seed should be soaked, before sowing or planting. *See* SOWING.

Perhaps old urine, or even common salt, would be found a valuable addition, in making a liquor for steeping seed before sowing.

Seawater is said to contain saltpetre, sulphur, and oil, beside common salt; and is therefore preferable to the latter article for manuring, when put in composts, or otherwise.

Mr. *Deane* makes mention of a hundred hills of potatoes, which had two quarts of water applied to each, immediately after planting; and he says that the product of these was one-half more than the same number of adjoining hills produced. Most probably, a quart to each hill would have been better.

He mentions also a piece of flax, of which one side was short and yellow; but, on its being sprinkled with this water, it equaled the rest of the piece in about ten days, and eventually was the best.

These two experiments were made on stiff soils, but he says he found sandy grounds equally benefited by this manure.

This water might be carried from the sea some distance on the land, to advantage, in the following manner: Take a one-horse cart, and suspend a tight box, rightly shaped, under the axletree; the box having a valve in the under side; drive the cart into the water, and the valve opens, and lets that fluid into the box; and, when the cart is driven out, the valve closes and holds the water.

When the cart is driven out to the ground on which the water is to be spread, this operation may be performed in the manner we shall next describe: A tube is to be provided, say, twelve feet in length, with small holes bored into it at the distance of six inches apart, and the ends of the tube closed; attach this to the under side of the box, crossways, at either end, so as to be out of the way of the wheels of the cart.

When you come to where the water is to be spread, it is to be let out of the box into the tube, by an aperture for the purpose; and as the cart moves along the water runs out of each of the small holes in the tube, and thus sprinkles over a piece of ground of twelve feet wide, till the whole is exhausted.

With the next load, begin where the water ceased runing before, and thus continue the watered strip across the field.

Then take another strip of twelve feet wide, adjoining that already watered, and thus proceed until the whole has been gone over.

In this way, one Man could carry out, say, forty cartloads a day, at the distance of half a mile, or half that number, if a mile; as but little time need be spent, either in loading or unloading. About ten loads, of a hundred gallons each, would probably be sufficient for an acre at any one time.

But this is not all that may be done with seawater: It may be drove any distance into a country, in aqueducts for the purpose, with the aid of wind-machinery. Say, for instance, that it can be drove on ascending lands, to the height of an hundred feet, with one wheel and crank turned by the wind. When raised that height, and emptied into a cistern for the purpose, it may, in the same way, be drove up to the height of another hundred feet, by another wheel and crank turned as before; and so on to any given height required. So that the highest cultivable lands, or those most remote from the sea, may in this way, and with the cart before described, be manured with seawater.

The sprinkling of the water over the land may be done at a small expense, as we have just shown. The principal expense therefore is the aqueducts for carrying the water. These, if made of wood, would probably cost a thousand dollars a mile, including all other necessary apparatus. Every mile in length would serve for two square miles of land. The wood forming the aqueducts, being constantly saturated with salt-water, would probably last a century. The expense, at this rate, would fall short of ten cents per acre, by the year.

In addition to the use of the water for manure, a great saving could be made in the use of salt, for cattle, and in various other ways in which this liquid might be, in part, a substitute for that article.

The method of driving water up an aqueduct is by a plunger, and two valves; one within the aqueduct to keep the water from returning, as the plunger is drawn back by the crank; the other within the plunger; and, while this is receding, its valve opens to let in more water, and shuts again while the plunger is advancing; and at this time the other valve opens to let the fresh supply of water pass through it. Thus, the valves open and shut alternately, similar to those in a common pump.

Whether the advantages to be derived, from puting a plan of this kind into operation, would warrant the expense, must depend on the result of experiments to be properly made.

On some parts of our seacoast it would be impracticable; particularly on most of that of North-carolina; where the wide and extensive bodies of fresh water forming the Albemarle and Pamlico sounds lie between the sea and most of the main land of that State.

But there is much of our coast, and the contiguous islands, which offer many millions of acres to be benefited by this method of manuring lands.

The stale of cattle is in part valuable, on account of its containing more or less of common salt, and perhaps in part from its tendency to produce miasma, septon, or azote, some or all of which assist the growth of plants. The older the stale the better it is, as a manure.

Under Soiling, one method of saving it is mentioned, and another will be spoken of before we close this article.

Urine from the domicil is still more valuable, as possessing the properties of that of cattle, but in a higher degree, and should always be saved in the manner we shall presently mention. It has a powerful effect, when sprinkled over grass-grounds.

Common salt is considered more efficacious, when mixed in composts, than when applied in its crude state to the soil. Mr. *Elliot* makes mention of five bushels of this manure being sown, in its crude state, on an acre of flax, and that it had a surprising effect. We have seen this crop very much assisted, with the application of only two bushels of it to the acre.

An intelligent Farmer once observed to us, that during our Revolutionary War, when this article was so dear that he could not afford to give it to his cattle, his barn-dung seemed to be of but little service to his lands; but that he found the case much altered, when he could again afford to deal out a sufficiency of it to his stock.

We will also here mention a small pamphlet we saw in Maryland, some years since, which was mostly the certificates of Planters of the interior of that State, describing the surprising effects produced on lands there, by sowing a mixture of salt and fine mould upon them; particularly when applied to crops of wheat and flax.

These lands were such as had become much exhausted, by constant crops of tobacco, and Indian corn; and on which few cattle had ever been raised; of course little or no salt had ever been given them, since they were cleared.

We mention these matters, as inducing our belief that some of this ingredient is highly essential to the productiveness of soils; and that, where they are long destitute of it, a little may have a powerful effect upon them; as a manure.

Nor would we confine this observation to common salt alone: We believe it may be applied to all the salts which operate as manures. If too much common salt be, however, given to lands at once, it will prove injurious, for a while at least; and perhaps the same holds equally true, in regard to the other salts.

We have seen a late newspaper publication, which very highly recommended common salt, as a manure for turnips. Mr. *Deane*, however, says he once made trials of it upon this crop, upon onions, and on carrots; and that the latter crop only was benefited by the application.

Perhaps he either applied too much to the two former crops, or the soil might not have required any addition of this ingredient; as we have seen a little of it used very successfully, as a manure for onions.

Whether common salt may be profitably applied, as a manure, must depend on its price, its effects on the growth of different plants, and in different soils, and situations; as it is supposed not to be so powerful in its effects on lands near the ocean, nor, perhaps, on some soils, as it is on others.

But little attention has been paid, in this Country, to the operation of *lime*, as a manure; though, in some instances, we have heard of its being very successfully applied.

Under EARTHS, something has been said in regard to lime, as a primitive earth, and as being one of those which are essentially necessary, as a component part, in forming a durably fertile soil.

Lime is of singular use, in destroying the adhesive quality of stiff clays; and it is on soils of this description, and on cold loams, that it has been considered, in Greatbritain, as most efficacious. On such soils, the British Farmers usually apply about two hundred and forty bushels to the acre, which is considered a full manuring; the effects of which are usually manifest for eight, ten, and twelve of the succeeding crops.

If lime be applied to the lighter and drier lands of that Country, not much more than half of that allowance is given at once.

An opinion was held by Mr. *Livingston*, that lime is most suitable to lands in a cool moist climate, such as that of Greatbritain; and Mr. *Brownel* considers it as an improper manure for lands containing much vegetable earth; but perhaps experience may show, that both of these opinions are in a great measure erroneous.

Lime will reduce peat and turf to a mere vegetable earth; but we believe it never proceeds so far in the work of decomposition, as to destroy vegetable matter, or lessen its quantity where it abounds.

It would be desirable that accurate trials of lime were made, in order to ascertain its value in our soils, and whether it should be held in as high estimation here, as in Greatbritain, where its use, as a manure, is very extensive.

We will here give the inferences of an experienced practical Farmer of that Country, from various trials of lime on clays, on loams, and on sandy loams on a close retentive bottom.

1. That lime operates equally well, whether applied when fresh slaked, or when it has been some time slaked, provided the condition of the ground be such as to render a calcareous application beneficial.

2. That it is not material, whether lime be used on grass-land, or on Summer-fallow; but may be applied as may be most convenient, especially on new clean grass-land. On land which has long lain in grass, it is thought best to take one crop after breaking it up; and then to Summer-fallow, and apply the lime.

3. That to lime moorish soils is hazardous, unless dung be likewise bestowed; and to repeat the application, especially where such soils have been severely croped, is almost certain loss; and that a compost of lime and rich earth is, in such case, the only proper substitute.

4. That strong loams and clays require a full dose, to bring them into action, as such soils are capable of absorbing a great quantity of calcareous matter; and that lighter soils require less lime, to stimulate them; and may be injured by a quantity that would prove but moderately beneficial to those of a heavy nature.

5. That upon fresh land, or that which is in a proper state for an addition of calcareous earth, lime is much superior to dung, as its effects continue for a longer time, while the crops thus grown are of a superior kind, and are less liable to be injured by drought, or by excess of moisture; and that the stiff soils particularly are so much easier worked, when well limed, that this circumstance alone is almost a sufficient inducement to apply lime to such grounds, if it possessed no fertilizing properties.

Finally, that though strong soils require to be animated with a good dose of lime, while those of a light texture require but little more than half the allowance of the former, especially where they are fresh, or have not been before limed; still judgment is requisite in the application: But that it is generally safer to exceed the proper quantity, than to be below it; for that, in this latter case, the manure may prove almost wholly useless; while it rarely happens that the ground is injured by an excess of lime, especially if more or less dung be soon after administered.

A circumstance calculated to strengthen the belief, that lime will answer well as a manure, in almost every part of this Country, is, that the Romans used it as a manure in

Italy, when they conquered Britain, and are supposed to have first introduced it in that Island; for, although the Summers of the latter Country are much moister and cooler than ours; still those of the former are nearly as warm, and perhaps full as dry, as the average of Summer-weather here.

And if lime enables crops the better to withstand droughts, which are often more severe here than in Britain, this would seem to be an additional reason for its use, as a manure, in this Country.

Lime is also of singular use in producing a high degree of fermentation, in all soils which require it; and this is essential to their productiveness, in every country and climate.

The British Writer to whom we have just refered says, however, that experience has shown that lime will not restore lands which have been completely worn out by constant crops of grain. He therefore supposes lime to be merely calculated to bring certain principles into action, which were previously possessed by the soil, and which are probably lost when thus exhausted by severe croping. But again he says, that all lands are benefited by lime, 'which can be refreshed by grass, or enriched by dung.'

We have thus far given the Reader the substance of what we find in the latest and best British Publications on lime, as a manure: But, from information we derive from Dr. *Mease*, of Philadelphia, we are enabled more particularly to state the quantity proper for an acre in this Country; and also that which has been found most efficacious, as a manure, in Pennsylvania.

We have mentioned two hundred and forty bushels to the acre, as being the allowance for clay-soils in Greatbritain; but we are induced to believe that where so much is applied, in that Country, it must be of lime made from chalk, which is much weaker than that made of limestone.

Forty bushels to the acre is about the usual allowance of lime of this latter description on the lands of Pennsylvania, which are commonly a loam mixed with more or less of either sand or gravel. It is also found that the lands which have there been previously limed, are more powerfully stimulated by the application of gypsum, than those to which lime has not been recently applied.

Under Earths, we have mentioned that, in Greatbritain, lime which has the most magnesia in it is accounted the least valuable; but, in Pennsylvania, it is found the most efficacious.

The quality possessed by lime, of producing a great degree of fermentation, renders it of singular use in making composts. These are frequently made, in Greatbritain, from mere collections of alluvial or other rich earths, wherever they can be had, and mixing them with lime sufficient to produce the requisite degree of fermentation, which is to be effected by frequently stiring up the mass with the plough, or the shovel; and in this state is carted out, and mixed immediately with the soil.

Composts are also made in some parts of that Country, in which peat commonly forms about three-fourths of the mass; the remainder being fresh barn-dung, together with some lime to be laid on the top, to assist in the decomposition of the peat, as the mass becomes properly heated.

The peat and the dung are first to be laid down in layers, in proportion to their respective quantities, until the heap is made about four feet high. Sticks are to be run down into the heap, in different parts of it, to ascertain the degree of heat the mass has acquired; and whenever it approaches to blood-heat, it must be either watered, or turned over, as there is danger of the whole being consumed, particularly in warm weather, if the mass become too warm.

After the heat subsides, which it does in time according to the state of the atmosphere, and the degree of perfection in proportioning the materials of the heap, it is to lie until about three weeks before it is to be applied to the soil; when it is to be turned upside down, outside in, and a second heat comes on, which must be carefully attended to, as before; and, when this subsides, the mass is to be applied to the soil.

The mass of manure thus made is found to be as good, as the same weight of roten barn-dung. Care and experience seem, however, necessary in making this manure to perfection. In Summer, it may be made in eight or ten weeks: In cooler weather, a longer time is necessary.

Where the peat is taken from beneath the surface, it should be thrown up some time before, for the purpose of drying, and being lighter in transportation. The compost, while making, should be kept as light as possible.

See Earths, in regard to the description of peat.

That which abounds on the surface of some swamps, and uplands, is readily decomposed by the application of lime, and mixing it with this earth.

We will mention another kind of compost, in which lime is an ingredient, as recommended by the Society of Improvers in Scotland, for making use of the ridges along-side of fences, in fields which have been long ploughed.

First plough the ridge deep with a cleaving furrow; then cart on a layer of stiff clay, then a layer of barn-dung, then another of clay, and on the whole a layer of lime, and cover the mass over with ploughed earth from each side, and let it lie a while; then enter it with a deep cleaving furrow, and in this way plough it to the bottom; then go over it again with gathering furrows, until the whole is thrown up into a high ridge, and in this situation let it again lie to ferment.

Repeat the process of cleaving down, and ridging up, at proper intervals, till the whole mass is well fermented; and then cart it out, and mix it with the soil, at the rate of about thirty-five loads to the acre.

The component parts of manure made in this way, or something similar, should be adapted to the soil intended to be manured.

Mr. *Young*, of Delaware, greatly improved wornout clay-lands, by composts, in which lime was a principal ingredient; and, while the land thus became redeemed from absolute sterility, the soil at the same time became darker in color, and lost that stubborn adhesiveness, so troublesome in clay-soils.

Mr. *Ashford*, of Pennsylvania, put two hundred bushels of lime on nine acres; planted the ground with Indian corn; left one acre unlimed; crop of corn great, where the lime was applied. Next year, Summer-fallowed, and had good wheat and rye, where the land was limed. Sowed herds-grass and clover, and applied gypsum to the whole; had a good crop of grass, where the land was manured with lime; but poor, where it was not.

This was probably land somewhat stiff, and considerably exhausted. It would seem that stiff lands are commonly very considerably assisted by gypsum, after having been manured with lime.

Mr. *Ashford* says he ploughs his land for Indian corn in the Fall, lays on his lime in the Spring, and is never troubled with either worms or weeds. He brings home all his cornstalks in the Fall, lays them down, firmly troden, with alternate layers of lime; and next Spring he finds the mass roted and fit for use.

If he were to add some barn-dung, and some earths, suitable to the soil to be manured, he would find his heap of compost much improved in quantity, and perhaps in quality.

Peachtrees, when planted in grass-grounds, where they naturally grow but indifferently, are much assisted by strewing some lime round the roots. This probably assists in repeling insects, as well as in serving as a manure for the trees.

See ORCHARD, where Mr. *Coxe* assisted the growth of his young appletrees, by a compost in which lime was an ingredient.

Pigeons' dung, which is chiefly calcareous matter, is found very efficacious, when powdered, and a slight quantity applied to lands; while, at the same time, too much will prove hurtful at first. The dung of other fowls is very similar, though some more and some less efficacious.

See POULTRY, where this kind of manure is to be made in the greatest quantities.

We must also notice human ordure, which is capable of being converted into a very powerful manure, after being mixed with suitable earths, and having a due length of time to prepare it in a compost of suitable earths, &c. It requires two years to bring it to perfection.

Barilla is highly valuable, as a manure. Old woolen rags are also very good. A piece, of the size of a Man's hand, will serve to manure a hill of potatoes, when properly buried in the soil beneath the growing plants.

We will now speak of another calcareous earth which, in this Country, is commonly entitled to the highest consideration, as a cheap and valuable manure, and this is *gypsum.*

'One hundred parts of gypsum (says Mr. *Chaptal*) contain thirty of sulphuric acid, thirty-two of pure earth, and thirty eight of water.' 'If it be kept in a fire of considerable intensity, in contact with powder of charcoal, the acid is decomposed, and the residue is lime.'

'Gypsum is found in the earth in four different states: 1, in the pulverulent and friable form, which constitutes gypseous earth, fossil flour, &c.; 2, in solid masses, which constitute plaister-stone; 3, in stalactites; and, 4, in determinate chrystals of different forms.'

'The color of gypsum (he adds) is subject to a great number of varieties, which are the signs of various qualities, relative to its uses. The white is the most beautiful; but sometimes it is gray, and in this case it is less esteemed, and less valuable. The several states of the oxyde of iron, with which it abounds, in greater or less quantities, constitute its rosecolored, red, and black varieties.'

For almost all soils, except clays and wet loams, this is the cheapest manure that can be applied; and its use in this Country serves greatly to equalize the value of lands, by rendering those which are naturally poor almost as productive as the rich.

The gypsum that abounds in the interior of the State of Newyork is much superior to that of Novascotia; not only as to its being a greater stimulant to the growth of plants; but in regard to its being more general in its operation, better calculated to assist the growth of all plants, in all soils and situations.

It has been successfully applied to old meadow-land of timothy-grass; to growing crops of wheat; and on lands near the ocean; in all of which cases the Novascotia gypsum is usually applied with little or no effect.

In another instance, however, we have seen it inoperative on timothy-grass, on a dry loam; while it had its usual effect on the clover growing on the same soil. Its effects are not always the same; but most certain when applied to clover, by greatly increasing that crop, and by puting the land in good condition for almost any other, when the clover-sward is turned under.

As gypsum, when sown on suitable grounds, always produces a spontaneous growth of white-clover; and as this growth is an infallible indication of the soil being thus rendered in good condition for a crop of wheat, or rye; where, therefore, either of these crops is to be raised on fallow-grounds, the better way is to sow the gypsum early in the Spring, and, as soon as the growth of this clover is produced, break up the soil, and prepare it for the crop, by further ploughings in due season; and in this way the product will commonly be double what might be expected on the same ground, without the application of this manure.

Thus, suppose that the ground be a dry loam, or gravelly loam, so exhausted that ten bushels to the acre, of wheat, could only be obtained by the common culture; let two bushels of gypsum to the acre be applied, early in the Spring, and by the middle of June, or sooner in more southerly climates, the ground will be covered with a sward of white-clover; and then, with the same culture, twenty bushels to the acre may be expected, and the ground will be in much better condition for another crop.

The same difference may be expected, where a crop of rye is to be raised, on ground suitable to its growth.

The most powerful operation of this manure, in proportion to the quantity used, is in applying it to dry the seeds, after being soaked in some fertilizing liquor, such as a mixture of old urine, lye of wood-ashes, or strong soapsuds, with a solution of saltpetre, and sown or planted immediately.

The effects of such treatment on seeds of Indian corn, buckwheat, peas, oats, barley, and perhaps flax, will probably be found the greatest; but, if the gypsum of the State of Newyork be used, perhaps its effects may be found more generally useful.

When potatoes are cut for planting, it is of singular use to the growth of the crop to sprinkle on gypsum, before the cut parts have dried; and also to apply some to the hills, before the seed is covered, about a table spoonful to each.

Indian corn is also greatly benefited by a similar application to the hills. Let the gypsum be scattered a little in both cases.

Its effects on pumpkins, squashes, and other plants of that sort, is said to be great; also, on cabbages, and probably on turnips of different kinds, as they are all different sorts of Brassica. Most probably, all plants will be more or less assisted, in their growth, by a proper application of gypsum.

Every Farmer and Planter ought to keep a constant supply of this excelent manure, if it can be obtained at any reasonable price, and his lands be more or less naturally sterile, or exhausted, and suitable for its application. He will find that, with proper management, every bushel he applies to his lands will yield him double, and from that even to ten-fold, its value, according to his soil, the price gypsum costs him, and the uses to which he applies it.

Its application, together with the cultivation of red-clover, and other suitable grasses, to almost all the dry-lands of the Atlantic States, lying south of Pennsylvania, is a desideratum of the utmost importance to the Planters of that naturally fine tract of country; a country not generally of a very strong durable soil; that has suffered much from the most exhausting crops, and the worst of husbandry; but is, nevertheless, susceptible of being made second to none in the United States, by a proper system of culture, with the aid of gypsum, and other suitable manures, and grasses.

Generally speaking, little else but these are wanting to raise the value of the plantations of that country to five, and, in some instances, to ten, times the amount of the prices they at present command.

Col. *Taylor*, of Virginia, from various trials of gypsum, draws the following conclusions: That this manure should be mixed with the earth, by harrowing or ploughing; that drought may defeat its operation on Indian corn, if the manure be not thus worked into the soil; and that its effects on this crop are as great in this way, as when applied to the hills; that it increases the fertilizing effects of coarse barn-dung; that gypsum may greatly increase a crop of red-clover, when sown even as late as May; that even a half-bushel of this manure, to an acre, may often be found as efficient as a much larger quantity; that an excess of moisture, or of drought, commonly destroys its operation; that the state of the ground, or of the atmosphere, whether wet, or dry, at the time of sowing this manure, is not essential; but that the state of each, afterwards, is of particular consequence; that its effects are more likely to be defeated when sown on the ground, than when worked into it; that sowing it broadcast on Indian corn, after it is up, may improve the crop twenty-five per cent; that, sown in June, it may improve English grass; that sown in August, and worked in, it may improve the ground; and that, sown in November, it will most probably neither assist the crop, nor the land.

This, it must be remembered, is the Novascotia gypsum.

Mr. *Peters* says the foregoing very nearly agrees with his experience. He says he has always derived very beneficial effects, in raising every kind of grain, from first weting his seed, and then rolling or drying it in gypsum, before sowing; but that he never experienced any benefit, by sowing this manure on any kind of grain, usually sown in the broadcast, except buckwheat.

He had probably never tried it on peas, and other leguminous crops.

He found it excelent for tobacco. He says it will not operate on an exhausted soil, that has become destitute of vegetable or putrescent animal matter; but that when either of these, or lime, is applied to such soil, then the gypsum, even if it has been lying in the soil, without effect, will have its usual operation. At the same time, he says that lands newly cleared, which have commonly much animal and vegetable matter in them, are not assisted by this manure.

He also considers it as efficient as lime, for the purpose of expeling insects from the soil.

Acids applied to gypsum produce an effervescence; and this is, therefore, one method of distinguishing this manure from other kinds of limestone. Another is, to reduce the mass, supposed to be gypsum, to powder; then put it in a vessel over the fire; and if it be gypsum an ebullition will take place, when the mass becomes sufficiently heated.

We have been informed, that gypsum has a most powerful effect, when applied as a manure to strawberry-plants, by greatly increasing the size and quantity of the fruit. We believe that all leguminous plants, and all those which grow above ground, in the shape of vines, derive much benefit from this manure.

Mr. *Livingston* says, that in traveling through Flanders he found that pyrites were used as a manure, particularly for grass-lands, at the rate of about six bushels to the acre. The seed-grain is also covered with it, as it is with gypsum in this Country. The stone is sufficiently impregnated with sulphur to burn, when dry, and this is the method there used to reduce it to powder. For this purpose, it is laid in heaps, and when it has become red with burning, the fire is extinguished; for if it burn longer it becomes black, and then the quality is not so good.

After the burning, it is easily reduced to powder; and as a proof of its great value, as a manure, he observes it is carried forty and fifty miles into the country, on the backs of Asses.

Mr. *Livingston* is of opinion that the sulphuric acid in this, as well as in gypsum, is the fertilizing principle; that in this slow combustion this acid is absorbed in the burnt earth, while the inflammable matter is dissipated; and that the union of the alkali and the acid forms a salt not unlike, in its chemical relation, to gypsum, or perhaps one that is more soluble, more impregnated with the acid.

Refering also to a circumstance mentioned by *Duhamel*, where this acid being scattered over weeds, with the view of destroying them, only made them grow with additional vigor, he observes, that probably if it were diluted, and applied to the soil, or mixed with woodashes, and applied in that way, it might answer the purpose of gypsum. And in order to find an acid that would be cheaper and better, as being already composed of a constituent part of vegetables, he observes that the pyro-ligneous acid may be obtained, at a trifling expense, by converting wood into charcoal, and condensing the vapor; as the charcoal would of itself repay the expense of the operation, particularly where wood is cheap.

Mr. *Livingston* further observes, that he has seen pyrites on his own estate; and advises that experiments be made of this earth. It is to be laid in beds about four feet thick, and while burning should be stired with a rake. When cooled, pound it fine and sift it. If the earth should prove too inflammable, he advises to give it a mixture of lime, which, by the process of burning, would be converted into gypsum; or wood-ashes would be found useful. If the pyrites be in lumps, it must be reduced to a coarse gravel, before burning.

A due attention to the recommendation of Mr. *Livingston* on this subject might be productive of very beneficial results, as no doubt many parts of the interior of this Country may be found, abounding in pyrites which are destitute of gypsum.

Mr. *Chapman*, of Pennsylvania, tried sulphuret of barytes, calcined, as a manure, and found that it even exceeded gypsum in its effects, not only on dry gravelly lands, but also on clays. It drove insects from his garden. He considers it the most powerful manure ever yet discovered. Care must be taken, however, not to strew it on the growing plants, lest it kill them.

In preparing some, for the purpose of making an experiment, he took twenty-four pounds of this earth, mixed it with three pounds of powdered charcoal, and put the whole into an earthen jar, with a light cover thereon, and burned it in a Poter's kiln.

Sulphur is also found to be nearly as efficacious, as a manure, as it is for expeling insects.

Pulverized stonecoal, says Mr. *Muhlenberg*, is a good manure for most soils. Four hundred pounds are sufficient for an acre. Pulverized charcoal is also good; and the same may be said of pulverized slate, limestone, and shells of shellfish. The latter are also good to be ploughed in whole, in a dry soil, for the purpose of increasing its moisture.

Burnt-clay, good for cold stiff soils.

See BURNT-CLAY, and BURNBAKING.

Every part of animal substances may be converted into good manure. The flesh, in decomposing, discloses abundance of azote and miasma; and some of the constituent parts of blood are alkaline and sea-salts, oil, air, water, &c. all of which are essentially the food of plants. The bones, when powdered, are good as a top-dressing; and even the shavings of the horns, and of the hide when curried, are good in composts, or when buried in light soils. The flesh should be spread over the ground, and ploughed in immediately. The blood is best used in composts.

Of vegetable manures, those which are either ploughed down for green-dressings, or are otherwise buried in the earth while green, are much more efficacious than when dried, especially if long exposed to the weather.

See GREEN-DRESSING.

Such may, however, be useful when brought into Cow-yards, and there mixed with the dung of the cattle, by which means they absorb much of the stale and juices of the excrements, which would otherwise be lost. For this purpose, almost every kind of plant, whether green or dry, is more or less useful.

Of the contents of the barn-yard, Horse-dung is the worst, and Sheep-dung is much the best, as a manure. If the former be suffered to lie long in a heap, it will be spoiled by its own heat, which is to be known by its white mouldy appearance, and therefore should be applied to the soil as soon as possible. It is most suitable for cold, wet, and stiff soils; and the same may be observed of Sheep-dung, though this will greatly assist any soil. Cow-dung is best for light or dry soils.

Every kind of barn-dung is much injured by being suffered to lie exposed to the rains; and therefore should be kept as much under cover as possible. It should be carted out in the Spring, and immediately buried in the soil for a crop of Indian corn or potatoes, in order that the seeds of weeds which it contains may be destroyed by the hoings and subsequent ploughings. Or if any part of the dung be retained in the barn-yard, for making composts, it should be that which is under cover; and if this be the Horse-dung, let it be immediately mixed with some cooling earths which are fit ingredients for composts.

These may be made of every ingredient that can be gathered together, that is calculated to manure the soil for which it is intended. Clay, sand, mud, lime, peat, &c. may therefore be parts. To these may be added the scrapings of the back-yard, turfs on which cattle have long dunged, old rubbish of buildings, earth that has been long covered, banks of rich earth that have been thrown up by the plough against fences, and generally all rich earths which can be spared. On the heaps of composts should be thrown all the soapsuds, dishwater, meatbrine, urine, water that has run from dung, and generally all the filth that is collected in and about the house and barn.

Composts should be frequently stired up from the bottom, in order that a due degree of fermentation may eventually pervade the whole mass; and when in this state of fermentation they should be carted out, spread evenly on ground well prepared, ploughed in lightly, and well mixed by the harrowings which cover the seed that is at the same time to be sown.

A heap of compost of this kind may be made to advantage near the dwellinghouse, for the purpose of receiving from it the additions that may be afforded there. Or it may be made adjoining the Hogpen, to receive all its contents; for Hog-dung is an excelent manure for all dry soils. Such a stock would be found of signal use, as a manure for the turnip-crop.

See TURNIPS.

These heaps of compost will be the better to be slightly covered, so as to admit no more rains than will serve to keep them in a proper degree of moisture. If properly prepared, they will be found much superior to equal quantities of raw barn-dung; and, if proper pains be taken, very considerable quantities of them may be made every year.

An excelent method of making a large quantity of manure, with little trouble, is as follows: In the Spring, enclose a piece of ground, say, ten rods long and two wide; have the two end fences so that they can be speedily removed at pleasure to plough the ground more easily. After ploughing it with a cleft furrow, turn the Milch-cows and young cattle upon it every night. After they have saturated the surface, plough it with a gathering furrow; and so on alternately, at intervals, until the ground is completely saturated with their stale and dung. Then cart it off, and apply it as before directed for composts.

By first carting earth and rubbish into the barn-yard, the same process of making manure may be carried on there; but this requires an additional carting, which greatly enhances the expense. It is usually better to make these yards in suitable places, and drive the cattle into them, after the Cows are milked. They may be made in the field intended to be manured. Sheep, however, should never be shut up in this manner, as it will be found more hurtful to them, than the advantage gained by their manure is worth. Perhaps the same may be observed of Horses.

Let a slight shed be made in a Sheep-pasture, and under this cart a layer of sand or other earth: The Sheep will resort to this for shade if it be the only one in the field. As they saturate the earth thus carted in, bring in more and spread it over the other; as this becomes also saturated, let more be brought in, until the mass is raised so high as to render it necessary to cart it off to manure the soil, as before directed. The same process may be carried on in the Sheep-pen, during Winter, to nearly equal advantage. The earth becomes in this way so fully saturated with the urine and excrements, that it becomes very good manure. The stale and manure of Horses and other cattle might in part be saved, during the warm Summer-days, in the manner above directed for Sheep.

The Reader will find the most effectual and complete method of making the most of the manure, which is usually lost in Summer, under SOILING OF CATTLE.

Mr. *Peters* says that barn-dung should not be completely roted, before using; but that it should be so far advanced in putrefaction, as to destroy the vegetative power of the seeds of weeds it contains; that it should be applied to the soil while it is still in a state of fermentation, and during the latter part of the process of roting.

There seems to be some diversity of opinion, on this point. Some say dung should be perfectly roted, before it is used; while others contend for burying it in the soil, before roting.

We believe that any given quantity of fresh barn-dung may, in most cases, be rendered more productive by being first roted to a certain degree; and that it will go still farther, when properly mixed in a compost: But, as additional expense must, in either of these cases, be incured, this should be duly estimated, and regulated according to circumstances.

For instance, if labor is high, the price and the produce of lands low, and the lands already in a high state of fertility; there may be a loss incured in expending too much labor in making the most of the contents of the barn-yard.

But, if the case be reversed, by the land being deficient in affording the greatest products, the prices of these, and of the land, sufficiently high, and the wages of Laborers moderate; there a proportionately increased expenditure, in manuring the land, will be found essentially requisite, for obtaining the greatest clear profits.

A sound discretion is indeed essential, in determining how much may be expended, to advantage, in manuring lands; but, generally speaking, much is lost in falling short of that point where, by the aid of plentiful manuring, the greatest profits are to be expected.

See further, STERCORARY, for the means of making the most of barn-dung.

This manure, in its crude state particularly, should always be buried to a good depth in the soil; and in this state should remain there till it has sufficiently roted; for by lying upon, or too near, the surface, much of its efficacy seems to be lost by evaporation. While the valuable qualities of some manures, such as salts of various kinds, are constantly *sinking* into the earth, the contrary, in a great measure, seems to be the case with barn-dung.

Old graveyards, where the Dead lie closely intered, are always remarkable for their fertility: The miasma produced from the putrefying matter, though laid at a great depth, is constantly *rising*, and of course enriching the surface; and such, to a certain extent, would seem to be the case with barn-dung, while in a decomposing state.

Mr. *Peters* observes, however, that grass-crops are an exception to the general rule, of deriving most benefit from barn-dung when well buried; as he has always found this manure, like all others, most efficacious in the growth of grasses, when used as a top-dressing.

It would seem that, for crops of this description, its efficacy is principally in serving as a covering to the ground, and thereby preventing the escape of moisture, which is more or less particularly essential to the growth of grasses.

We imagine it will usually be found more effectual, as a top-dressing, for some grasses than for others; and always most so on the drier grounds. For tap-rooted grasses, we think this manure should be buried in the soil.

Under EARTHS, we have described the method of burning peat, and thus reducing it to ashes, for a manure; but we are induced to condemn the practice, unless, perhaps, where it abounds in great quantities on the surface of the earth, as in the county of Sullivan, and the northerly part of Herkimer, and its vicinity, in this State, and in various other parts of the Country.

Generally speaking, it is believed that peat may be more advantageously used in composts, in the way before described; as in this way its effects will be greater, and much more permanent, as a manure.

Where the surface is but thinly covered with peat, it may be mostly burnt off, in a dry time, after the land is cleared; and then the ashes lie on the land where they are wanted: But in such case it would eventually prove more advantageous to the land to rot or decompose the peat, with lime, as before mentioned; after which the black mass remaining may be mixed with the earth below, so as to render it more permanently productive.

A surface of peat of this description may, however, be successfully cultivated with yearly crops of potatoes, until the peat, by roting away, can be mixed with the earth below, so as to form a mixture suitable for other crops.

Under Moss, that article is recommended as a manure for potatoes.

We have no doubt, that peat made fine, and mixed with some suitable earth, would answer a better purpose; as what seems most essential to the growth of these roots is to be placed where they can most easily extend, having at the same time a due degree of air and moisture; and it is probably for this reason that they grow well under a mere covering of straw.

Seaweed *(Alga Marina)* is afforded in considerable quantities on many parts of our seacoast, and is valuable as a manure, particularly for light dry soils. For clays it is not so good. It is best to be ploughed in the soil while green; as, when it has become dried, it is not so valuable as a manure.

It has two advantages over barn-dung; one in common, however, with most other manures, it contains no seeds of weeds; the other is, it tends to render light lands more compact, and for that reason crops of wheat raised on them are but little affected with mildew; while wheat grown on lands long manured with the contents of the barn-yard, becoming thereby more loose and friable, is found, in Great-britain at least, to be most liable to this disorder.

Mr. *Davy*, in his Memoir to the Board of Agriculture in England, after mentioning the different results of analyzed earths which were found extremely fertile, observes, that,

'In supplying animal or vegetable manure, a temporary food is only provided for plants, which is in all cases exhausted by means of a certain number of crops; but when a soil is rendered of the best possible constitution and texture, with regard to its earthy parts, its fertility may be considered as permanently established. It becomes capable of attracting a large portion of vegetable nourishment from the atmosphere, and of producing its crops with comparatively little labor and expense.'

See further, EARTHS.

When manures of the common kinds are to be applied, let them be laid on pretty plentifully, and generally for that crop which needs them most. They should be applied evenly to the soil. It is but too common to see dung scattered thickly round where the heaps were laid in carting out; while the ground farther off has little or none; but this is miserable management. All kinds of dung, in composts or otherwise, should be mixed with the soil as soon after carting out as possible, as they loose much by drying and evaporation.

It should, however, be remembered, that soils may be overcharged with composts, or with raw barn-dung. Too much even of composts in a sandy soil tends to overheat it, and thus lessen instead of increasing its moisture; and too much in clays tends to produce too rank a growth. Raw barn-dung may, however, be buried plentifully in clays, where its fermentation will be so slow as not to produce too great a degree of fertility. In sand, however, it is otherwise. Composts, or even raw barn-dung, is much more efficacious to the growing plants, when laid in the drills where they are planted, than when mixed generally with the soil; but as this requires much more labor and expense, and as the ground becomes hardened by carting on the manure, it is doubtful whether much is, in general, gained by the practice.

MAPLE *(Acer.)* There are nine sorts of this tree, enumerated by Botanists, in this Country; the most valuable of which is the sugar-maple; of which kind only something shall be said.

Where the Farmer wishes to save his sugar-maple-trees, he ought not to tap them in the common way; but, instead of this, bore a hole two or three inches into the tree, out of which the sap can be drawn; and let it be pluged up after the sap has done runing.

The method of making the sugar is too well known to need any minute description. It would be often well, however, if those who make this sugar, were to observe more cleanliness, in regard to the vessels in which the sap is gathered. Old troughs, which have lain for years exposed to the weather, are not very proper receptacles for the sap, if regard be had to the cleanliness of the sugar, and of course to its value. Some make use of vessels made in the form of pails, which they keep for the purpose, and this is certainly at least more cleanly. The vessels can be laid up every year, after the time of using them is past, and be preserved many years.

In clearing pasture-lands which abound with sugar-maple, it would be well to preserve these trees, as they do no injury to the pasture; but the difficulty is, that as soon as they become more exposed to the winds they are blown down. But let all the small maples in such grounds be left, and in a few years these will grow up with sufficient strength of root to withstand the winds, and become an article of profit and ornamental to the farm. They may also be very easily dug up in the woodlands, and transplanted into such pastures.

This is a piece of economy which the Farmer would do well to observe, if he wishes his farm to yield due supplies of sugar, when that article shall have become more scarce. Twenty trees to an acre would do little or no injury to the pasture; and ten acres of such a maple-orchard would, in a few years, yield no inconsiderable quantity of sugar. By boring the trees, as above directed, no essential injury is done to them; so that they might be increasing in growth for half a century, or perhaps double that length of time.

The sugar of the maple may be grained in the manner directed for graining the sugar of the beet; or it may be done in the vessel in which the sap is boiled, if it be not too large for the purpose.

See Beet.

The trees may be raised from cutings, or from the seeds.

MARES. Those which are kept for breeding are only here to be noticed.

Mares should not be suffered to breed, till after they are four years old. They should be free from distempers, lest their Colts inherit them. They should be of good color and size, well made, strong, and spirited, with bright prominent eyes. If the Mare have any defects, she should not be put to a Horse having the same. About the 1st of June is the proper time to put her to the Horse, and every ninth day afterwards, till she refuses to take him.

Mares with Foal should be housed pretty early in the Fall, and be well kept till foaling. They should not be riden swiftly, nor put to drawing or carrying burdens, for a month or two before foaling. The smell of a hide newly taken off will make a Mare lose her Foal. When about to foal, they should be kept in a yard by themselves.

It is very desirable to have the breeding Mares cast their Colts after the likeness of the Horse, as in that case their own form and qualities are not so essential. They should also give plenty of milk, in order that the Colts have a good first Summer's growth. A further and very essential requisite is, that they should be sure in being got with Foal every year, in order that the Owner may not be disappointed in his expectations of profit.

Good breeding Mares are profitable; but those not possessing the above qualities had better be kept for some other use. Pastures which are wet, and bear coarse grasses, are usually applied with more advantage to keeping breeding Mares than to any other purpose.

MARLE. *See* Manures.

MEADOWS. All mowing-lands are properly meadows; but, when we speak of these in general, we mean low moist grounds, which in their natural state are best fited for the production of grass.

Many pieces of land of this description, which bear nothing but coarse wild grass, might be made the best of lands by hollow-draining, and manuring with sand or other proper manure. This will render them fit for the plough, and well suited for the production of the largest crops of grass. Three tons of hay to the acre, beside Fall-pasturing, or perhaps a second crop, may be had from such pieces of land, after being thus improved. Such land would then be worth two hundred dollars an acre; while, perhaps, in its natural state it would not be worth thirty.

Farmers should study their own ease, pleasure, and profit, by fiting a small piece of meadow so as to yield them a sufficiency of hay. An acre, at two mowings, can be made to yield four tons of hay, and at this rate ten acres would yield sufficient for a hundred-acre farm. The greater ease, and saving of expense, in gathering forty tons of hay from ten acres of fine smooth meadow, instead of perhaps twenty-five acres of rough meadow, ought of itself to be a sufficient inducement for the Farmer to improve a part of his meadows, so as to answer in place of the whole.

Meadows may be pastured in the Fall, without much injury; but not closely. The after-growth of grass should never be too shortly eaten, but a part should be left to cover the roots during Winter. Good meadows are often spoiled by close feeding in the Fall; and in addition to this many Farmers practise feeding them in the Spring, until such time as the upland pastures have grown.

By these means the meadow is poached, and the roots of the grass torn to pieces, in such manner that not more than one-half of the crop is to be expected, that might be obtained, by pasturing moderately in the Fall, and none in the Spring.

By this bad management, too, all the best grasses are eaten out, as cattle will eat these the closest; or, being more tender, they are destroyed by the feet of the cattle; and in the mean time the wild grasses usurp their places, to the great injury of the meadow.

Where a meadow is quite wild, it should be mowed rather before the grass has attained its full size, and in this way it may yield a tolerably good second crop; while each crop, by being mowed while very green, and by adding a peck of salt to every ton, may be converted into good fodder. By mowing wet meadows very early, the grass may be out of the way before the heavy rains which often fall in the month of July. Meadows which are entirely of wild grass are much less liable to be injured, by close pasturing and the treading of cattle, than any other; the treading of such grass will not essentially injure it, and the cattle are never disposed to eat it very closely.

For destroying moss in meadows, *see* Moss.

MELON *(Cucumis Melo.)* Seeds brought from the Southward produce the best melons, and the seeds should occasionally be renewed by a fresh supply from that quarter.

Mr. *Miller* says they should be three years old before planting, and that those which will swim in water should be rejected.

The ends of the runers, and the fruit last formed, says Mr. *Deane*, should be taken off, in order that the fruit first formed may have more nourishment, grow larger, and arrive to greater perfection.

A sandy loam, with a southern exposure, is best for melons. A good manure to be put under them, when planting, is an old compost made of good loam and the dung of Neat-cattle or Swine. The Canteloupe is the finest-tasted melon.

The above observations apply equally to the watermelon *(cucumus anguria)* the mode of culture of each, being well known, requires no particular description.

See Insects, for the means of keeping these from the young plants.

METHEGLIN. A hundred pounds of honey is generally used to make a barrel of this liquor; but Mr. *Deane* says he found ninety pounds to answer very well. It improves considerably by age, and becomes as strong as common wines. The liquor is made thus:

Take of honey and clear water, in the proportions above mentioned, and boil them for an hour: When the liquor is cool, barrel it; adding some ginger, cloves, and mace;

though it will answer tolerably well without these. Some yeast must be put in the cask to ferment it. Let it have a little vent, while fermenting; but close the vent as soon as most of the fermentation is over. It will be improved by being bottled, after five or six months.

MILDEW. Mr. *Young* says that when the wheat-stem has a particular cast of a bluish green, it is then affected with mildew.

Mr. *Marshal* directs, that as soon as wheat is discovered to be struck with mildew it should be cut; and that this serves to *prevent* the *effects* of the mildew; that wheat may be thus cut three weeks before the usual time of harvesting.

The grain in this case will be smaller than usual, but will make much better flour, and the quantity will be greater, as the skin will then be found very thin. If the grain has attained its full size, though only in the milk, it is sufficient; it receives that nourishment from the stalk which serves to mature it. The green stalks of the wheat must be sufficiently dried, before stacking; and when carted in they will be found bright and clear of the mildew, and will make good fodder.

Mildew is probably owing to a revulsion of the sap in the stalks of the wheat, occasioned by cool nights, when the atmosphere has become cooler than the earth, which in that case forces the juices upward too fast, and thus bursts open the stalks; as they are perhaps more easily split than those of any other plant whatever. The knowledge of this, however, points to no practicable preventive of mildew; all that can be done is to counteract its *effects*, as above directed.

In treating of mildew, we mean to be understood to speak of that disease of wheat which causes the stalks to become covered, in a greater or less degree, with a redish substance, something similar to the rust of iron.

We have seen wheat which was in no wise affected in this way; but still of no value; being almost wholly destitute of grains of any size worth preserving.

This disease we call *blight;* but, as we know of no means of preventing it, we shall content ourselves with barely mentioning, that we have seen its ravages most complete on intervale-grounds, adjoining waters which occasioned a heavy fog in the morning. Wheat should never be sowed on such ground.

For preventing mildew, let wheat always be sowed sufficiently early, as this disease is usually much the most fatal to the late-sown grain.

See, also, SOWING, for the means of making wheat and other grain ripen early.

MILKWEED *(Asclepias Syriaca.)* Under GREENS, we have mentioned the young stalks of this plant, as an article of food. The plant is also called silkweed, on account of the pod it produces, which contains a vegetable silk. This, adhering to the seeds, is calculated to waft them by the winds in every direction.

This plant has been considered as a troublesome weed, in much of the northern parts of this State; but perhaps the use which may be made of the pods, of the leaves, and of the milk of the plant, may be found much more than sufficient to counterbalance any inconvenience to be suffered from it.

We will first point out the use made of the pods, in France, as communicated by Mr. *Genet:*

'The silky substance collected from that plant (says he) is used in France, with great advantage, and is cultivated under the name of *houatte* or *wading*. They card it, spin it, and manufacture it into velvets, cloth, and hose, with or without the intermixture of cotton or silk.

'It is also used for wading to stuff quilts and counterpanes; and for that purpose it is far preferable to cotton, being warmer and lighter. To card it by itself, they expose it in bags to the steam of water; but, mixed with silk or cotton, it does not require the intervention of the steam, to be made into rolls and spun. The velvets and other textures made of that vegetable silk, which I have seen in Europe, resembled, if not exceled, the brilliancy of the silk; and, with proper mordants, had received the most elegant coloring.'

Mr. *Genet* subsequently adds: 'I have been informed that a French Gentleman, who attends the Dyers' department of the manufactory of Mr. *Lynch*, at Rome, has discovered that the leaves of the asclepias, and probably of all the apocinums, were an excelent substitute for the woad.'

See WOAD.

'Dr. *Low*, of Albany, has also observed, that the milky juices of the asclepias were equal, if not superior, in many respects, to the opium extracted from the white poppy.'

Thus it appears that this plant affords food, clothing, medicine, and matter for coloring. Probably its cultivation may yet be found a matter of considerable importance.

We have also seen the pods gathered, as a substitute for feathers, in making beds. We believe they might be most advantageously mixed with feathers, for that purpose.

MILLET *(Panicum.)* The stalks and leaves of this plant resemble those of Indian corn, though much smaller. It grows to the height of about three and four feet. A sandy soil suits it best, and it should be sown in drills, about three feet apart. The plants should stand about six inches apart in the rows, after hoeing. It will produce as large crops as Indian corn, and bears drought admirably well. A crop of it sown thick, and mowed green, is excelent fodder.

'This grain (says Mr. *Deane*) is a good food for fowls and Swine. For the latter it should be ground into meal. Some mix it with flour in bread; but it is best for puddings.'

MOSS *(Lichen.)* There are various kinds of this: Some grows on trees, on stones, on the shingled roofs of houses, on the surface of the ground; and some of a very minute kind, which is commonly called *mould*, on the surface and in the crevices and cavities of almost every substance which is wet or moist.

Moss is particularly injurious to the growth of trees and of grass. Its growth is encouraged on fruit-trees, where the soil is either too cold and wet, too sterile and dry, or too thickly planted. Where the soil is too cold and wet, the best remedy is hollow-draining, and manuring with sand, Sheep-dung, and other manures suitable to the soil. Where it is too sterile and dry, dig away the earth from about the roots, and supply its place with a mixture of earth and mud from ponds or creeks, or some other rich earth, that is better calculated to retain moisture. Where the trees stand too thick, cut part of them away, rub the moss off the rest, and apply *Forsyth*'s method of *heading down*, if necessary, making use of his *composition* to preserve the wood.

See FRUIT-TREES.

Where moss prevails in grass-ground, apply a heavy sharp iron-toothed harrow to it; scarify the top of the soil till it is somewhat raw, strew some seeds of herdsgrass, or other good grass, over it, and give it a good dressing of a mixture of Sheep-dung and sand, or other warm manure that is suitable to a cold soil. This is for grounds sufficiently dry; but if the moss be occasioned by too much wetness in the soil, although the above method may prove beneficial for a while; yet nothing short of hollow-draining will ever prove effectual, for any considerable length of time. Gypsum will also eradicate moss on dry loams.

By experiments, says Mr. *Deane*, it is found that the common yellow moss is a good manure for potatoes. It would seem to be best, however, when mixed with stable-dung, or rather laid on top of it. It is said to be very good to mix with lime in composts, as the lime is best calculated to dissolve the oil it contains; and oil is known to be an ingredient in the food of plants. It is also recommended to be mixed in dry sandy or gravelly soils, for the purpose of enabling such to retain a due degree of moisture.

MOWING. This being a laborious employment, it becomes necessary for the Mower to husband his strength to the best advantage. For this purpose, the first requisite is to have a good sithe, of proper length, if the mowing-ground be not too rough, well hung on a light stiff snead; so that the sithe will not tremble as it goes through the grass; having the edge of the sithe to face the nib which is held in the left hand; and to keep it well ground and well wheted. As much art is requisite in keeping a sithe in the best order, as there is in learning to mow well.

The sneads most commonly used are bent in a twisted shape; but some use a snead which is nearly in the shape of a half-circle, and the latter are always prefered by those who have become used to them. They take a wider swath with the same extension of the arms; a larger cut, and therefore may be slower; require less stooping; and from the position of the body which is requisite to enter the point of the sithe into the grass, being more twisted round to the right, little more is requisite than bringing the body to its natural posture to carry the sithe through.

Mowers should always be at their work betimes in the morning, so as to have half their day's work performed before the heat of the day; and then they can afford themselves a resting-spell during the most sultry hours. By this mean, too, the mowed grass has a longer time for drying during the day.

Where mowing-grounds or meadows are of perfectly smooth surface, as they ought always to be, particular pains should always be taken in mowing to cut the grass as close to the ground and as evenly as possible. Mr. *Young* remarks, that grass will never thrive well that is not mown quite close; and the loss in the crop where this is not done is very considerable, 'as one inch at the bottom weighs more than several at the top.'

MOWING-GROUND. We generally apply this term to arable lands that are laid down to grass. But little is necessary to be said under this head, further than what has been said under GRASSES and MEADOWS. This may, however, be observed of all grasses which are not biennial, that where the ground becomes bound it is good husbandry to tear it well with a sharp iron-toothed harrow, after manuring, and in this way to mix the manure with the soil as much as possible, particularly if the strength of the manure be such as is calculated to evaporate by drying and exposure to the air.

It may also be further observed, that it is a waste of money to lay down to grass lands which are exhausted by severe croping, unless they are of such nature as can be recruited by gypsum, or some other similar top-dressing. Generally, if lands be poor, and cannot be assisted by gypsum, they ought to be recruited while under the plough, not while under grass.

Ground that is full of small stones may be fited tolerably well for mowing, by passing a roller over it after sowing; but the better way is, to gather the stones into small heaps and carry them off, and they will then be of no further trouble in future crops. It is almost unnecessary to add, that all grass-grounds should be laid down smoothly, by being well harrowed after sowing.

MUD. *See* MANURES.

MULBERRY (*Morus.*) This tree is well worth raising, not only for its fruit, and great use in feeding Silkworms, but also for its timber and for fuel, as it grows very rapidly, and is generally well adapted to our climate. It grows well in a deep dry soil that is moderately rich. It may be raised from the seeds, or by cutings or slips.

See further, HEDGES and SILKWORMS.

MULE. This animal, propagated by two distinct species of the *Equus* or Horse-tribe, to wit, the Horse, commonly so called, and the Ass, is generally barren; though some instances have been known of its breeding.

It is a healthy, hardy, and useful creature; subject to very few disorders; will live on the refuse of the fields, or the woods; and yet, with the hardest and scantiest fare, will labor incessantly, and seem hardly sensible of fatigue.

Mules live much longer than Horses. They are obstinate, however, and require to be kept almost constantly in use, as a few days of idleness renders them very refractory, when again put to labor.

Where they can be kept pretty constantly in use, either in draft, or under the saddle, they will perform double the labor that a Horse is capable of enduring, and with half the expense in keeping.

They are also uncommonly surefooted, and may be rode over the roughest and steepest ways in safety, where there would be none, when mounted on Horseback.

In Spain, they are prefered, by the Grandees, to Horses, for riding; especially in the more mountainous parts of that Country.

In every situation, where their labor is almost constantly required, they are certainly much more profitable to keep than Horses; and the same may be observed, where they are to be used in broken mountainous Countries.

For further observations, as far as they may be applicable to the Mule, we refer the Reader to articles HORSE, FOALS, &c.

MUSTARD *(Sinapis.)* This plant requires a soil sufficiently strong for turnips. Let the ground be well prepared, by ploughings and harrowings early in the Spring, and sow, of well-ripened seed, at the rate of two quarts to the acre. When the plants are a few inches high, thin them, so as to stand about ten inches apart, and destroy the weeds with the hoe.

When the lower seeds are ripe, the middle seeds green, and the top of the plants in blossom, cut them with a sickle, bind them in moderate-sized sheaves, and put these in small stacks for a few days. In this situation the green seed will soon ripen. Carry the sheaves to the barn, having a large cloth under them, to prevent wasting, and in a few days they will be fit for threshing.

The ground for raising this plant should be previously well cleared of weeds.

The best mustard for culture is Durham mustard, or *Sinapis Arvensis.* The culture of mustard is profitable.

MYRTLE *(Myrica.)* This is a beautiful shrub, or tree, as the different species or varieties of it may be ranked, according to the size they grow; but the species recommended for culture are those which bear the most berries, commonly called the candleberry myrtle; or, *Myrica Caerifera Latifolia.*

In France, they are cultivated for the wax afforded from the berries. It is extracted by boiling them in water, when the wax rises to the top. Four pounds of the berries afford one of wax. Candles made of it burn with a clear white flame, and, if burned when newly made, afford an agreeable and salubrious odour.

The wax is superior in quality to beeswax, and applicable to all the purposes for which the latter is used. The wax of the myrtle is of a pale-green; but, as is observed by Mr. *Green*, its color may be deepened of that hue, by throwing some alkali into the water in which the berries are boiled.

Other ingredients for coloring may be used, for giving it different colors which are pleasant to the eye; such, for instance, as the juice of the pokeberry *(Phytolacca)* to give it a color equal to the famous Tyrian purple; or, slighter infusions of the juice, to give red of various hues.

Tallow might have different colors given to it, in a similar manner.

Mr. *Green* says the candleberry myrtle is to be found, in plenty, on the shores of the Chesapeake, and near most of the streams which flow into that bay.

He has also found it scattered over the State of Newyork, growing in a wet soil, and very rarely exceeding six feet in height.

He has also seen, what he deems a variety of the same species, on uplands in Connecticut, growing to the height of twelve feet; but this is not so productive of fruit.

In Louisiana, a species of it, with pointed leaves, grows as large as the cherrytree.

N.

NEAT-CATTLE. All tame animals which are fed in pastures, are, properly speaking, cattle; but, to distinguish the Cow-kind from others, they are usually called *Neat-cattle.*

Of these are various breeds, which appear to be original and distinct, though perhaps climates and soils may have done something in producing these varieties. The most obvious of these is the *Galloway*, or *polled* breed, as they are called in Greatbritain, or the cattle without horns. Other breeds in that Country, where, perhaps, the greatest variety is to be found, may be well worthy of notice.

1. The original or wild race of that Country. Color invariably white; horns tiped with black; end of the ears, inside and outside, redish; black muzzles; flesh fine and well tasted.

2. The *Devonshire breed*, said to be in part descended from the above race. Color, light-red, with a light-dun ring round the eye; thin face; thin skin; hips wide; tail quite low; rather small-boned; horns turning upward. The Cows yield good rich milk. Oxen good for draft, and faten early.

3. *Dutch*, or *shorthorned breed.* Hide thin; horns short; tails set high; color red and white, nearly mixed; tender

constitutions; faten kindly; and yield large quantities both of milk and tallow.

4. *Lancashire breed*, with straighter horns than those of any other; spreading widely and extending forward; large and square-built; fore-quarters deep; milk not abundant but rich; the animal hardy. From an intermixture of this breed with others, Mr. *Bakewell* obtained his *Dishley* breed; which are remarkable for fating very easily, and upon the most valuable parts; though they yield but little milk or tallow, when compared with some others.

Considerable pains have been taken to introduce Bulls of this, or similar breeds, into this State, without any apparent knowledge of the uses to which the Calves from such Bulls were to be applied. It should have been understood, that such breeds are not so well fited for Milch-cows as for fating-cattle, and in England are raised for that purpose.

5. *Highland breed*, or *Kyloes*. Horns turned upwards; colors various, chiefly black, though sometimes brindled or dun; hair long and close; bodies well shaped; best suited for cold mountainous countries; good for milk, and kind to faten.

6. *Polled breed*, before mentioned. Shaped like the Devonshire breed, though rather shorter; hides moderately thick; hardy, and faten kindly on the best parts; flesh good, and well mixed with fat: Oxen good for draft. A variety of this breed of Cows, called the *Suffolk Duns*, are excelent for the dairy. These are small, lean, big-bellied, and of a dun color.

7. *Alderney*, or *French breed*. Small; light-red; smooth neat horns; tender constitutions; rich milkers; flesh good.

8. *Welsh breed*. Chiefly black; small, with horns thick, and turning upward; well shaped; vigorous, and well calculated for labor.

Our cattle mostly resemble those of the Devonshire; but evidently we have mixtures of various breeds; so much so, that no specific characters can be given them. We have also the polled breed distinct by itself; though sometimes they are found mixed with others.

Mr. *Livingston* observes, that Black-cattle are uncommon in France; but almost universal in Southholland and Brabant; that the butter made in the latter Countries is much inferior to that of the former; and hence he concludes, that the butter of Black-cattle is inferior to that made from Cows of lighter colors, which is agreeable to the common received opinion.

'A perfect Cow (say the Compilers of *The Complete Grazier*) should have a broad smooth forehead; black eyes; large clean horns; thick skin; large deep body; strong muscular thighs; large white udder (*yellow* is better) with four long elastic teats, together with every other token requisite in a Bull, allowing for the difference of sex. They should also be young; for Milch-kine are not good for breeding after they are twelve; though they will often live much longer, if kept well and free from diseases.'

Heifers generally arrive at the age of puberty when they are eighteen months; though instances have occured where they have brought forth Calves before that time. The better they are kept the sooner they will breed. If, however, they breed so early, they should be highly kept; for, otherwise, they will be apt to be stinted in their subsequent growth.

Mr. *Bakewell* used to keep his Dishly breed of Heifers from the Bull until the age of three; but Sir *John Sinclair* attributes to this their often missing being with Calf. It is believed to be best to follow Nature's law: Let them go to the Bull as soon as they feel the inclination.

Breeds of cattle are usually much improved by crossing or mixing different kinds together; and it also seems essential that there should be no pro-creation between animals which are nearly related. Let there be little or no consanguinity between the Bull and the Cow which is put to him. This seems to be agreeable to the laws of Nature; and, among Men, is strikingly exemplified in the degeneracy of the race, where the Peasantry of some small secluded districts constantly intermarry with Relatives; or where the pride of Families has served to preclude a due intermixture with others.

But in the best breeds of all animals, some of their young will always be found more promising than others; among cattle, therefore, where a selection is to be made, pains should be constantly taken to select the most promising for raising; provided they are brought forth in the proper season; and this for Calves should be early in the Spring. Those brought forth late will not so well endure the succeeding Winter; and, if Heifers, will usually go to the third year, before they are with Calf; while those, which are earlier calved, will usually bring forth a year sooner.

In the selection and improvement of breeds of cattle, a due regard is to be had to the uses for which they are intended. Thus, if the best Milch-cows are desired, select from the breeds of those which are known to be the best for that use; that is, admiting the size to be equal, those which yield the most of such *cream* as makes the *best* butter, in any one year, are generally to be prefered. This is to be ascertained by keeping the milk of different Cows separate, and then the quantity and quality of their products can be easily determined.

The size of Cows is not so material; as, it is found that all cattle eat nearly in proportion to their respective sizes. What would be necessary to feed one of the large Lancashire breed of Cows, would be nearly sufficient for two of the Aldernay breed, before mentioned; while the milk of the two latter would, probably, nearly double that of the former. There is hardly any breed of Neat-cattle but what are sufficiently large for Milch-cows, if well kept; for it should be remembered, that all cattle will grow much larger, if well kept, than if kept poorly, during the Winter season particularly.

In Greatbritain, much pains have been taken to select breeds which should unite the two most valuable qualities, of being the best for milking, and the kindest to faten; but hitherto such breed is said not to have been found. Sir *John Sinclair*, however, observes,

'It is probable, that by great attention a breed might be reared, the males of which might be well calculated for the shambles, and the females produce abundance of milk; and yet when they reached eight or nine years might be easily fatened.'

He further adds, that some of the English and Scotish breeds have nearly reached this point of perfection.

If the object of the Farmer or Grazier be merely to raise cattle for fating, then, perhaps, some of the larger breeds may sometimes be best. In large towns, particularly, a piece of a mammoth Ox, when highly fated, seems more desirable, and will usually command a greater price, than an equal weight of equally good beef of a small animal. The Dishly breed, before mentioned, are highly esteemed in Greatbritain, for this purpose. The most essential points, however, in a breed for Fating-cattle are, that they grow rapidly, in order that they may soon attain their full size; that they are of comely shape, for this will usually enhance their price with the Butcher; that they keep easily and faten kindly, and on the *best parts*, as the English Graziers say; and that their beef be tender, sweet-flavored, and well mixed with fat.

In this Country, but little has been done in the way of raising cattle which are only intended for fating. Our Working-oxen are usually bought up, at the age of seven or eight years, for the purpose. For the best breed of Working-oxen, therefore, due attention should be had as well to their possessing the foregoing requisites for good Fating-cattle, as to their being strong, hardy, quick-paced, and good for the draft.

The signs of a good Ox, says Mr. *Deane*, are, thick, soft, smooth, short hair; short thick head; glossy smooth horns; large shaggy ears; wide forehead; full black eyes; wide nostrils; black lips; thick fleshy neck; large shoulders; broad reins; large belly; thick rump and thighs; straight back; long tail, well covered with hair; and short broad hoofs. The best colors are brown, dark-red, and brindled.

Young Steers, which are intended for labor, should be early yoked and taught to draw; for if this be delayed till they have attained considerable growth, they are more difficult to break. They should be moderately worked at first with old Oxen, till they have acquired sufficient strength, and become enured to labor.

If yokes be used, let that part which rubs against the breast and neck be rubed with tallow, when worked much in wet weather, to prevent soreness.

When an Ox is eight years old, he should be turned off to faten; and, to promote his fating, let a little blood be taken from him. If kept longer, his flesh will not be so good.

Lord *Kaimes* observes, that, among cattle, the strongest rules, and claims precedence by taking the lead; that if the strongest Ox be not therefore first unyoked, he is apt to be unruly while his Fellow is leting loose.

At the age of four years, all Neat-cattle have one circular ring at the root of their horns, and one additional ring yearly thereafter. When, however, they become quite old, these rings become so indistinct, as no longer to be separately perceptible.

For the Bull, the finest-looking Calf, possessing, as nearly as can be judged, the foregoing requisites for a good Ox, should be selected, and from the finest of the breed which he is intended to propagate; and he should not be suffered to go to a Cow until he has attained a good growth. Suffering young, or dwarfish, or ill-looking Bulls to go to Cows, only tends to degenerate the breed; and, in the two former cases, the Cow, by being served with such, frequently misses having a Calf.

The Bull should have good keeping, so that he may be in prime condition when he is put to Cows. When he is about eight years old, if he grows cross and mischievous, he should be castrated and turned off to faten. Bulls may be broke while young, and worked, and then they prove much less refractory.

In regard to Calves, those which are brought forth early, are best for raising, as they will endure the first Winter better; and, if Heifers, will generally be with Calf a year sooner than those brought forth late. The most promising Calves should be selected for rearing, for the uses intended, and the rest fated and killed. In fating such, Mr. *Deane* advises, that they be taken from the Cow the next day after they are calved; and let them have only two teats of the

Cow to suck during the first week, three, during the second, and all during the third and fourth; and in this way, he says, they will be fater in the end, than if they had all at first. The teats which are not given them should be previously milked.

In Holland, Calves are fated in coops or pens made for the purpose. These are merely narrow boxes with bottoms of lattice work, just so wide as to admit the Calf to lie down, but not to turn round, and sufficiently high to stand up in. They hold but one Calf at a time, which is kept in darkness. When it is to be fed, a small hole is opened in front, just large enough to put its head through, which it readily does, being attracted by the light, and the pail of milk is then presented to it to drink. A lump of chalk is also hung up by the door for the Calf to lick at. The box or pen is to be kept sweet and clean. In this way, says '*The Complete Grazier*,' they faten much faster than in any other.

Whether Calves are kept for fating, or for rearing, feeding them three times a day is much preferable to feeding them only twice; but, whether fed twice or thrice a day, the times of feeding should be regular, and as nearly equidistant as possible.

Dark coops or boxes, something similar to those above described, are also provided by some of those who make a business of fating Calves for market, in the vicinity of the large towns in England, where they are treated in a manner similar to that above mentioned. Fresh litter is constantly provided for them to lie on, and particular attention is paid to their cleanliness. The use of the chalk is for correcting the acidity of their stomachs. Pains are also there taken to have Calves brought forth at different times during Winter for fating, as the veal then commands a great price.

They are kept five or six weeks, before they are killed; and a little before killing, and also, when about four weeks old, they are plentifully bled; taking as much away as they can well bear, which is usually about a quart at each time. The principal use of the bleedings is, to give a superior degree of whiteness to the veal. Keeping them in dark places tends to keep them quiet, so that they do not fatigue themselves by too much exercise. They are fated with various kinds of food beside milk, as that is in such places too valuable to be much used. The most common articles used are choped turnips and potatoes, grains, bran, sweet hay, &c. No doubt, a little flaxseed broth, mixed with hay-tea, would be an excelent addition.

In regard to the best food for rearing of Calves, the method pursued by Mr. *Crook*, as mentioned in '*The Letters and Papers of the Bath and West of England Society*,' deserves to be mentioned. In 1787, he purchased three sacks of linseed, value 2*l.* 3*s.* (equal to about nine dollars) which lasted him three years. One quart of seed was boiled in six quarts of water for ten minutes, to a jelly, which was given the Calves three times a day, mixed with a little hay-tea. Thus he was enabled to rear, in 1787, seventeen Calves; in 1788, twenty-three; and in 1789, fifteen, without any milk at all: And he states, that his Calves throve much better than those of his Neighbors which were fed with milk. Thus, it seems, that less than eighteen cents worth of flaxseed, with a trifle of hay, is sufficient for one Calf. Linseed oil-cakes, when pulverized and boiled, make an equally good broth, or jelly.

The above is nearly similar to the directions of Mr. *Clift*, of this State. He directs, that, after the Calf has been fed for a fortnight upon sweet-milk, give it skim-milk, mixed with an equal or larger quantity of flaxseed broth or jelly, and let it be given to it milk-warm Enough jelly may be boiled at once for three or four days; but, if the weather be warm, it will spoil by souring. With this drink, Mr. *Clift* says, Calves will thrive as well as if fed on sweet-milk. For learning a Calf to drink at first, the best method is, to let it suck your finger with its nose in the milk.

Mr. *Budd*, of Massachusetts, directs to take the Calves from the Cows when three days old, and feed them with gruel composed of one-third barley and two-third oats, each ground fine, and the mixture sifted. A quart of this gruel is to be given to each Calf, morning and evening. The gruel is made by taking one quart of the flour, and twelve of water, and boiling them together for half an hour, and is to be given when milk-warm.

In about ten days after commencing the feeding, tie up and suspend a bundle of sweet hay in the middle of the pen where the Calves are kept, which they will eat by degrees. A little of the flour put into a trough for them to lick, is also of service. Feed them till two months old, increasing the quantity as they grow larger. Half a bushel of the above mixture is sufficient for one Calf.

The communication of the above method, obtained for Mr. *Budd* the prize from the Agricultural Society of Massachusetts.

When Calves are put into pasture, it should be such as is dry and sweet. White-clover is the best for them: Red-clover or trefoil is also good. Mr. *L'Hommedieu* recommends that there be no water in the pasture, but sufficient of shade. The effect of this is, that the Calves learn to feed at night, or when the dew is on, and lie by in the day; and as grass, while wet with dew, is believed to be most nourishing, they will, in this way, thrive much better than those which have free access to water; for this, it is contended by Mr. *L'Hommedieu*, tends to stunt them and make them pot-bellied. Probably, the better way is, to give them a little nourishing drink, at certain times, when the dews fail, or at mid-day, when the weather is very warm.

When the weather is pleasant, after being put to pasture, the males may be castrated and the females spayed, if they are designed to be raised for fating.

During the first Winter, Calves should be kept in a comfortable place, and have plenty of good fodder and a little Indian meal, or other nourishing food. They should have shelter earlier than larger cattle, as they cannot so well endure the first approach of cold weather.

Although Calves, until a year old, should have the best of keeping, let it not be supposed, that they will afterwards thrive well with very indifferent keeping. It is but too common for Farmers to turn their young growing cattle into poor pastures, of stinted growth, or into woods where there is not sufficient for them to eat; by means of which their growth is retarded, and, what is sometimes worse, they learn to become habitually unruly, from the constant temptation they are under of breaking into fields where there is plenty.

In the first settling of new countries, the extensive woodlands may afford plenty of good food for young cattle; but the woodlands of old settled countries afford but little food, that is well calculated for their nourishment and growth. In such cases, a few cattle are sufficient to overstock the woods, so as to leave them little to eat, excepting what is obtained to the great injury of the young growth of timber.

Growing cattle, if their pastures be not of the best, should nevertheless have plenty to eat of that which is middling good; and the same may be observed, in regard to their Winter-food; they should have plenty of such fodder as they will eat freely, and they should be well sheltered from the severity of the weather. When exposed to cold rains in Winter, they are frequently more injured, than when exposed to much colder snow storms. From each of these they should be sheltered, as well as from the cold winds. In short, the better and more comfortable young cattle are kept, the larger and more rapid will be their growth; and, although middling good keeping will answer, they will do better with better keeping.

The keeping of Cows in such manner as to make them give the greatest quantity of milk, and with the greatest clear profit, is an essential point of economy. Cows are in general very poorly kept in this Country. By better keeping, they would afford more clear profit. Give a Cow half a bushel of turnips, carrots, or other good root, per day, during the six Winter-months, beside her hay; and, if her Summer-feed be such as it should be, she will give nearly double the quantity of milk she would afford, if only kept during Winter in the usual manner, and the milk will be richer and of better quality.

The carrots, or other roots, at nineteen cents per bushel, amount to about eighteen dollars. The addition of milk, allowing it to be only three quarts per day, for three hundred days, at three cents per quart, amounts to twenty-seven dollars. It should be remembered, too, that, when Cows are thus fed with roots, they consume less hay; and they are less liable to several diseases, which are usually the effect of poor keeping.

Raw potatoes should not, however, be given to Milch-cows, but should first be steamboiled; otherwise they will commonly lessen the quantity of the milk.

The feeding of Milch-cows, cattle for fating, and for labor, with roots and cabbages, is a very prominent part of the employment of the British Graziers, and of Farmers who attend to the dairy. For this purpose, fields of turnips, cabbages, carrots, &c. are raised, and fed out to the cattle during the Fall, Winter, and early Spring.

The Winters, however, in our northern States, being much severer than those of Greatbritain, renders the feeding of cattle with roots, &c. less practicable than it is in that Country. It is more suitable to the climate of the States south of Pennsylvania. Much more, however, might be profitably done in this way, even in Winter, than is generally imagined. If the Farmer, or Grazier, were first to provide himself with a cellar or apartment under ground, sufficiently large for storing away his roots, and sufficiently warm to prevent their freezing, with a place in it also for a *steamboiler*, for steaming the roots, he would then find but little difficulty in dealing out this food to his Cows, &c. even in the coldest weather.

In this case, however, they must be kept in stalls, with troughs suitable for this kind of food. Nor is there any additional expense in this; as it is well ascertained, that this is the most economical method of keeping Milch-cows, working and fating-cattle, as well during Winter as Summer. In Winter, as they can be kept warmer, and more comfortably, less fodder is requisite to keep them well, and much less is wasted.

See SOILING, for the reasons why stall-feeding is also to be prefered in Summer.

See also, STABLE, &c.

For a description of a *Steamboiler*, *see* that article.

¶ Milch-cows be pastured in Summer, they should have the best or first feeding of each pasture-lot.

See PASTURE.

See also, GRASSES, as it respects those which are best for pastures.

They should have plenty of water, and that which is good. It is also good for them to have plenty of shade, to which they can retire during the heat of the day. They should be kept quietly, not suffered to be worried with dogs, or by having stones or clubs thrown at them, as is but too common; nor should they be forced to travel too far, by having their pastures at too great a distance; for these are all matters which are essential, in order to their giving the greatest possible quantity of milk.

In regard to milking, and the proper treatment of the milk, *see* DAIRY, CREAM, CHURN, BUTTER, CHEESE, &c.

When Cows are kept very fat, they will not give so much milk. The proper state to keep them in, during Winter and Summer, is that in which they are usually found, when fed in good pastures during the latter season. On the contrary, where they are suffered to grow poor during Winter, and particularly about the time of calving, their milk will be greatly lessened in quantity during the following season. If they are plentifully supplied with food, as nutricious as that of green grass, they will usually give plenty of milk until very near the time of calving.

Some Cows are naturally barren, and this is said to be always the case where a male and female Calf are brought forth together; the male in such cases is perfect, but the female is incapable of propagating.

Particular attention should be paid to Cows, in regard to their keeping, for some weeks before calving. They should have plenty of good hay, and other succulent food, such as roots of the kinds before mentioned, or cabbages with the decayed leaves taken off; or, if in the growing season, they should have plenty of good sweet pasture or other good green food. The day and night after a Cow has calved, she should be kept housed, and her drink should be lukewarm when given to her. Let her be kept up for three or four nights thereafter, so as not to be exposed prematurely to the cold or dampness of the atmosphere; for this tends greatly to weaken her.

If she does not clean well after calving, Mr. *Deane* directs to give her a pail of warm water, with some wood-ashes in it. Particular attention should be paid to this; for, if the after-birth be suffered to remain in the *uterus*, it will become putrescent, and the smell will sometimes communicate an infection among other breeding Cows. They will also sometimes incline to eat the after-birth, which should be prevented.

For cleansing the Cow, the directions in '*The Complete Grazier*' are, to put about three quarts of water over the fire, and, when warm, stir in as much oatmeal as will make a strong gruel; stir it till it boils; then stir in a quart of ale, or two of table-beer, and a pound of treacle, and give it to the beast when lukewarm. This will also prevent their taking cold.

To regulate the state of the body, give a mash of bran, weted with warm water. Where the udder is hard, it should be milked three or four times a day; or the Calf should be allowed to suck at pleasure; and care should be taken that it sucks all the teats; for, when any of these are sore, the Cow will sometimes prevent their sucking them. If the kernel of the udder is hard, the hardness may be removed by rubing it three or four times a day.

The natural position of the Calf in the *uterus* is, with its forefeet and head foremost; the forefeet lying paralel on each side of the head, and the back uppermost. When found in any other position, it is unnatural, and the extraction of the Calf then frequently requires more than ordinary skill. It may be safely extracted by fixing a hook, with a cord to it, in the under-jaw of the Calf, and gently drawing it away. If the flesh of the Cow be torn in the operation, it should be carefully sewed up; and, if afterwards swollen, washed with warm milk and water. If the Cow disowns or refuses to lick the young Calf, a little salt sprinkled upon it will have the desired effect.

Sometimes, Cows, from abusive treatment, violent exercise, or that unnatural appetite, called *longing*, slink their Calves; and in such case they should be carefully treated, and kept warm and clean, till they recover. If they exhibit previous symptoms of this, it may frequently be prevented, by bleeding them two or three times.

It would be a great improvement of our husbandry, if our Farmers and Graziers, stimulated by the example of those in Greatbritain and elsewhere, would enter largely into the culture of roots, cabbages, &c. for feeding Milch-cows and fating cattle; as the business, when well conducted, is very profitable. In Norfolk, and some other parts of Greatbritain, great quantities of turnips are raised, and mostly used for fating. During the Fall, they are put into carts and scattered over the stubble of the last-harvested wheat-field, and care is taken to scatter them over every part of the ground successively, in order that each part may have equal benefit from the manure thus bestowed on the land.

The turnips are raised with an iron instrument fixed to a handle; on the other side of which instrument are edges, set crossways, to cut each root in four pieces, as they are raised. After the cattle have ate their allowance, which should be no more than they can eat at once, they should have some hay given them. Part of the crop of turnips is also gathered, and stored away for Winter-feeding, and some are left in the ground for Spring-feeding.

Other Farmers and Graziers, again, feed their fating and other cattle in stalls, where cabbages and roots of different kinds are fed out to them; and this is believed to be the most economical way. Some of these articles of food are much more efficacious, by being steamboiled.

For the various articles of food, for feeding and fating, *see* CARROT, PARSNIP, POTATOE, JERUSALEM ARTICHOKE, MANGLE-WURTZEL, BEET, TURNIP, CABBAGE, PUMPKIN, &c.

In stallfeeding, as well as in soiling, great attention should be paid to the comfort and cleanliness of the cattle. Dr. *Anderson* says, they should not only be kept clean and well littered, but they should be curried daily in the manner of Horses, and that they will faten much faster, and keep better, for this.

He says also, that particular attention should be paid to their having pure water, and such as they are fond of. It is obvious, that if such water be not given to cattle, they will not drink as much as they want, and will, therefore, remain in a suffering condition, which is repugnant to good keeping or easy fating. They should also have water often, so as not to be at any time suffering for want of it.

Dr. *Anderson* states, that he knew a Man who attained great opulence, by attending strictly to these matters, particularly to the important point of having a continued supply of the purest water for his Milch-cows; nor would he suffer the animals to put a foot in it, or even let it be tainted by their breath.

In addition to the various roots there used for feeding and fating cattle, meal of different kinds is used to advantage, either when mixed with steamed or raw choped roots, or with choped hay, or straw. Instead of wasting the straw, as is but too common here, it is all saved, and used for littering, and for choping up with strawcutting machines, for the purpose of mixing with other food, and thus a great saving is made of hay.

It would also be a great improvement to chop up our cornstalks in the same manner. The kinds of grain which might be used here to most advantage for grinding up and mixing, as before mentioned, are probably Indian corn, rye, and buckwheat. Machines are also used in Greatbritain for grinding different kinds of grain by hand, with which a Man may grind a bushel or more in a quarter of an hour.

In addition to the above articles for fating and feeding are the grains of breweries and distileries, and the refuse or wash of starch-factories, which, as they are all in a state of acidity, are considered by some to be the better on that account for fating. Mr. *Young* particularly recommends, that all meal should be in a state of fermentation, before it is fed out. The grains of breweries, &c. may be kept during Summer in vats under ground, being first well trod down, and then well covered with a sufficient depth of earth.

Oilcakes are also of great use for fating, and for feeding to Cows before calving, for the purpose of increasing their milk. It however makes the beef, which is fated solely with it, of a loose flabby texture, which is not so agreeable.

Flaxseed broth, or jelly, is also much recommended for fating. It is made by puting about a quart of flaxseed to seven of water, and then let stand about forty-eight hours; after which it is to be boiled gently for two hours, minding to stir it frequently, lest it burn. After it is cooled, it is to be mixed with meal, bran, or cut-straw, and fed out at the rate of about two quarts a day to each beast, and it is said to make a great saving in the article of food.

It is stated, in '*The Complete Grazier*,' that an intelligent Farmer of this Country, but of what part is not mentioned, tried fating with turnips, from October until February, and that his cattle rather lost flesh; but that on his substituting hay, choped potatoes, and Indian meal mixed together, they soon fatened.

Probably a difference in climates may produce different results, in regard to roots which are used for fating. But as the cattle in question were fed entirely on turnips, which might have produced too great a degree of laxity or scouring, it is probable, that had the turnips constituted only the same proportion of food which the potatoes did, they might have proved equally nourishing.

In regard, however, to raising the different articles for feeding and fating, those should be cultivated which are found most profitable in the different soils and climates of this Country; and which, at the same time, are found most efficacious for fating, or in producing the most, and the richest and best-flavored, milk.

On the experimental farm of the Marchioness of Salisbury (Greatbritain) parsnips are prefered, as well for feeding as for fating; and for the latter use are esteemed almost equal to the oilcake. The milk of the Cows fed with them is also very plentiful, rich, and well tasted. Next to the parsnip, is, perhaps, the carrot.

Mr. *Young* states, that four Bullocks, six Milch-cows, and twenty Working-horses were fed, a few years since, at Partington, in Yorkshire, for above five months, with carrots, which were the produce of three acres only, and with no other food than a little hay, during that time. He adds, that the milk was excelent in quality and flavor; and that the refuse or waste, with a small quantity of other food, fated thirty Swine.

The hay used for feeding and fating is greatly improved by the addition of a little salt. Mr. *Darke*, of Breedon (Greatbritain) says, that by adding only eight pounds of salt to a ton of flooded mouldy hay, he found that his Oxen did better on it, than others which were fed on the best.

The Proprietors of the Bolingbroke distilery, near London, say the Compilers of '*The Complete Grazier*,' have erected stalls for fating about three hundred and fifty head of cattle at a time. The stalls are paved with brick, and great attention is paid to keeping them clean. The food for fating is the wash or grains of the stills, and hay, and, occasionally, choped oat or barley-straw. The hay or straw is given twice a day, that they may ruminate as usual; and they have as much grains as they can eat. In general, they come readily to this food; though some are four or five days before they become fond of it. They are usually fated in about sixteen weeks. The grains are conveyed to the stalls in tightbodied carts, made for the purpose, and turned into vats fited for their reception.

Others, again, practise choping the hay and straw fine, with the strawcuter, and mixing it with the grains in the vats, and leting the mass lie two or three days, in order to give the taste of the hay to the whole. The cattle, thus kept, afford great quantities of excelent manure. Particular attention is paid to their littering, in order that, when done eating, they may lie down and repose comfortably; for comfortable and quiet repose, as well as cleanliness, is deemed essential to their speedy fating.

It would seem, that the saccharine parts of vegetables contribute very essentially in fating, and, for this reason, molasses has been successfully used in the Westindies for fating the poor old wornout Oxen that are used there. About half a pint is given them twice a day, mixed with other food, for this purpose.

A beast will eat more in a cold day, than in a warm damp one; and, therefore, where messes are dealt out in stall-feeding, regard should be had to this circumstance, when the food is such as may cloy the cattle, and thus weaken their stomachs; for in that case they are liable to fall back, until the tone of the stomach is recovered. Regularity in the times of feeding, and that those times be as nearly equi-distant as possible, are also essential points to be observed.

The quantity of food to be given to fating cattle should be in proportion to the weight of each. An Ox will eat a little less than a fifth of his weight, per day, of cabbages, and about a third of his weight of turnips, beside a little dry food to counteract the super-abundant moisture of the roots. For middlesized animals, from a bushel to a bushel and a half of Brewer's or Distiler's grains, with some dry food, will be consumed in a day. About a sixth part of the animal's weight, with the addition of some dry food, is the proper allowance, per day, of carrots or potatoes. About a pound of powdered oilcake, and another of hay, for every hundred weight of the animal, is the usual allowance, per day, of this food; but the quantity of the former is to be gradually increased as the fating progresses, until it is one-half more than at first.

It is stated, in the work last mentioned, that every load of hay and litter, given to beasts fating on oilcake, will make seven loads of dung; and, that one load of this is more efficacious, as a manure, than two of common barn-dung. It is also there stated, that Mr. *Moody* littered forty-five Oxen, while fating, with twenty wagonloads of stubble, and that the product of dung, when roted and fermented, was six hundred tons. Another trial is also there mentioned, of Mr. *White*, who tied up thirty-six Cows and four Horses, and while they ate fifty tons of hay and had twenty acres of straw for litter, made three hundred tons of roten dung, in good order for the land.

In addition to gathering stubble for the purpose of littering, our Farmers may supply themselves with ample quantities of dry leaves every Fall; as they may be easily raked up and gathered in the woods, for the purpose. Mr. *Livingston* makes mention of his having used this substitute, in his valuable essay on Sheep.

It may not be amiss to observe, in concluding our remarks on feeding and fating, that as the larger English breeds require richer pastures for thriving well, than the smaller, many of the best English Graziers have latterly prefered the best selections of the latter, as being on the whole most profitable.

When a beast is well fated, outwardly, it is indicated by its plump and comely appearance; its skin on the lowermost ribs will feel *kindly* and *mellow*, as the English Graziers say; that is, soft and yet firm to the touch; the part where the tail is set on, will feel plump and soft; and the *natch-bones*, as they are called, which lie on either side of the root of the tail, will feel loose and well covered. When also the cod of the Ox, or the naval of the Cow, feels thick, round, and plump, and the hips are well covered, these are indications of their being well lined with tallow.

As the Grazier is usually less skilled in judging of the weight of live-cattle than the Butcher, Lord *Kaims* advises selling them by weight. This may be done in a manner very similar to that commonly practised for weighing loads of hay. The beast is to be suspended, by being put in a box made for the purpose.

The weighing of cattle, he well observes, is also useful in order to ascertain whether each beast fatens in proportion to the value of the food bestowed on it; as it may, in some instances, be best to dispose of such as do not.

He says, that the four quarters are about half of the whole weight of the beast, when alive, and when its belly is moderately full; the skin is about the eighteenth part; the tallow about the twelfth; the remainder is composed of the head, feet, tripe, blood, &c. which offals never sell by weight, but in proportion to the weight of the beast. With a knowledge, therefore, of these particulars, and of the market-price of the beef, tallow, skin, &c. the Farmer or Grazier can ascertain what his beasts are worth, when alive.

By weighing fated Calves, when alive, says the same Author, and deducting eight pounds from every twenty, the remainder will prove to be about the weight of the four quarters.

The diseases of Neat-cattle are various; and frequently new and uncommon diseases occur. A Farmer in this vicinity *(Herkimer)* informs us, that he lost eleven head during the last Winter (1813) by a new, and till then unknown, disease. When his cattle where attacked with this disorder, it was indicated by small protuberances appearing round the neck; and, after the beasts died, some of these were opened, and were found to be full of worms or maggots. Probably, if these lumps or protuberances had been opened and cleansed, when they first appeared, the cattle might have been saved.

A disorder prevails among Neat-cattle, in the northern parts of this State, which is usually termed the *hoof-ail.* It has ruined many hundred cattle in this county. It would seem that the feet of the cattle first become diseased, and then they are frozen during the course of the Winter; after which they are of no further value, except for their skins.

There is probably something in certain soils, which is calculated to injure the feet of cattle in the Fall, and thus render them more liable to the frost of Winter. In Herkimer county, those cattle which are kept on farms of moist rich soil have been most liable to this disorder; and it is believed, that such as are fed on sandy, sandy loam, or gravelly farms, have seldom suffered in this way. Probably it would be found, that pursuing the soiling husbandry, feeding the cattle with plenty of rich food, as has been before directed, and keeping them well littered in warm stables, would at once be the most profitable and effectual method of avoiding this disorder.

In the Spring, our cattle which have been poorly kept through the Winter, are subject to a wasting of the pith of the horn, which is usually called the *horn-distemper*. It is sometimes in one horn only, and sometimes in both. The indications of the disease are, coldness of the horn, dullness of the eyes, sluggishness, want of appetite, and a disposition to lie down. When the brain is affected, the animal will toss its head, groan, and exhibit indications of great pain.

To cure the disease, bore a hole with a small gimblet in the lower side of the horn, about an inch from the head, and the corrupted matter in the horn will run out. If this does not complete the cure, Mr. *Deane* directs, that the horn have a mixture of rum, honey, myrrh, and aloes thrown into it with a syringe; and that this be repeated till the cure be effected. Probably warm water thrown in would answer just as well; as the essential point seems to be to cleanse the horn of the corrupted matter.

Another disease, to which our poorly-kept cattle are subject in the Spring, is commonly called the *tail-sickness*. In this case, the tail becomes hollow and relaxed. The cure is effected, says Mr. *Deane*, by cuting off a small piece of the tail, which will be attended with a small discharge of blood; or, when the hollow part is near the end, cut a slit in it one or two inches long, and this will effect a cure.

The *gripes* or *cholic*, is mostly troublesome to young cattle. When attacked with it, they lie down and rise up incessantly, and keep striking their horns against any object that presents. It is attended either with costiveness or scouring. In the former case, they are to be treated with purgatives; and in the latter, with restringents.

To stop the purging, give them half a pint of olive-oil sweetened with sugar; or a quart of ale mixed with a few drops of laudanum, and two or three ounces of oil of sweet-almonds. To promote purging, giving them five or six drachms of fine Barbadoes aloes, and half a pint of brandy, mixed with two quarts of watergruel, in a lukwarm state.

These are the directions of '*The Complete Grazier;*' but it is believed, that other purgatives and restringents would answer as well. In either case, speedy attention to the beast is necessary, in order to prevent an inflammation of the intestines, which must prove fatal.

The *scouring* is known in Neat-cattle by the frequent discharge of slimy excrement, loss of apetite, loss of flesh, increasing paleness of the eyes, and general debility. The beast should be immediately housed and put to dry food, and this, in the early stages of the disease, will generally effect a cure.

Should it, however, fail, it is directed, in the work last mentioned, to boil a pound of mutton suet in three quarts of milk, till the former is dissolved, and give it to the beast in a lukewarm state; or, in obstinate cases, boil half a pound of powdered chalk in two quarts of water, till it is reduced to three pints; add four ounces of hartshorn shavings, one of casia, and stir the whole together. When cold, add a pint of limewater and two drachms of the tincture of opium; keep the whole in a corked bottle, and, after shaking it before using, give one or two hornsful, two or three times a day, as the nature of the case may require. Sometimes, however, this disease proves incurable.

Cattle sometimes become *hoven*, as it is termed, owing to eating too much, when first turned into rich pastures, to swallowing potatoes, or other roots, without sufficient chewing, and to other causes. The stomach of the animal becomes distended with wind, and if a vent for this cannot be afforded the beast must die.

The usual remedy is to open a hole with a sharp-pointed knife, with a blade three or four inches long, between the hip and the short ribs, where the swelling rises highest, and insert a small tube in the orifice, till the wind ceases to be troublesome. The wound will soon heal again.

But some of the English Graziers have adopted an improved method of obviating this complaint: This is by providing a flexible tube, with a knob at one end; the tube, with the knob-end foremost, is run down the throat of the beast into its stomach, and then the confined air escapes through the tube. The operation is repeated, if necessary. The tube for a large Ox should be upwards of six feet long, as that is about the length requisite to reach the bottom of his stomach.

The method recommended by Mr. *Young*, for curing this complaint, is, to take three-fourths of a pint of olive-oil, and a pint of melted butter, or hogslard, and pour this mixture down the throat of the beast; and, if no favorable change be produced in a quarter of an hour, repeat the dose. For Sheep, about a gill should, in like manner, be given, and the dose repeated, if necessary. Mr. *Young* asserts this to be a specific, which will not fail of a cure in half an hour.

To prevent this disorder, cattle should not be turned at first with empty stomachs into rich pastures; nor should they be allowed to feed on potatoes and some other roots, without their being first steam-boiled, or cut in pieces. Where a beast, however, happens to get one of these in its throat, which cannot be forced down, take a smooth pliable rod and make a knob on the end, by winding and tying rags round it, and run this down its throat into the stomach, which will force all before it into that receptacle.

The *staggers* are easily known by the drowsiness, lethargy, and staggering gait of the animal. This disorder is sometimes occasioned by plethora, or fullness of blood, and sometimes it is seated on the brain; in which case it is incurable, unless by trapaning. In the former case, the remedy is to keep the beast housed, and to bleed and purge it sufficiently.

For wounds of cattle, *see* WOUNDS.

The *overflowing of the gall*, which is sometimes called the *yellows* or *jaundice*, is known by the yellow tinge in the mouth and eyes; and sometimes the whole body assumes a yellowish cast. The nose is dry; the udder of the Cow becomes swollen, and yields but little milk, which also becomes yellow and curdled, on being boiled; and sometimes the fore-teeth become very loose.

The beast affected with this disorder should be housed, and have two or three gentle purges; then give it, twice a day, a pint of beer in which has been infused, for three or four days, about an ounce to each quart of the filings of iron, and a small quantity of hardsoap. Let the beast be well kept during the time with warm messes of bran, and other nourishing food; to which some olive-oil, or other purgative medicine should be added, if the beast be costive.

For curing this disorder, Mr. *Deane* directs to take an egg and empty it of its white, retaining its yolk, and fill the cavity with equal quantities of soot, salt, and black-pepper; draw out the tongue of the beast, and with a smooth stick push the egg down its throat. Repeat this two or three mornings, and, he says, it will seldom fail of a cure.

Sometimes, however, this disorder does not yield to the yower of medicine; but at length turns to the *black jaundice*, which is incurable.

The disorder called *red-water*, or voiding bloody urine, it is believed, has seldom or never prevailed in this Country. Its attacks are mostly on young beasts, which in that case are seen leaving the herd, and exhibiting frequent ineffectual attempts to void urine.

The British practice has been to house the beast, and give it two doses of glauber-salts, of a pound each, in two succeeding days: But this practice is condemned in '*The Complete Grazier;*' and, instead of purgatives, strong decoctions of Peruvian or whiteoak bark and alum are recommended to be given, in such quantities, and at such times, as the violence of the disease may require.

The *pantasie* is known by the panting or heaving of the animal's flanks, which is accompanied with trembling and a decay of flesh. House the beast, and give it, every six hours, during the continuance of the chilly symptoms, a quart of warm strong beer, in which a table-spoonful of laudanum, another of ground ginger, and two of the spirits of hartshorn have been infused. The beast should be fed on sweet hay, and well littered. Its drink should be warm water, with a little nitre dissolved in it, if there be symptoms of fever. As it gains strength, let it out in the middle of the day, until such time as it has fully recovered.

The *inflammation of the liver* is indicated by fever, difficult breathing, a swelling near the shorter ribs, and in Cows, a remarkable distension about the womb. Cattle affected with this disorder will never faten. It is sometimes hereditary in certain breeds; in which case, it is incurable. In the work last mentioned, it is recommended to house the beast, bleed it profusely, and give it the following medicine in a tepid state, *viz.*

Saltpetre and glauber-salts, of each two ounces; Venice treacle, mithridate, and white ginger, pulverized, of each one ounce; let these be boiled in three pints of water, in which may be gradually added, one gill of oil of sweet-almonds; the whole being stired together. This is sufficient for one dose, which should be repeated the succeeding day. Warm messes of bran should be the principal diet of the beast, till it has recovered.

The *inflammation of the lungs* is known by a shortness of breath, and a painful cough. The animal looks dull; the skin is hot and harsh; and a copious discharge of thick ropy phlegm issues from its mouth. House the beast, bleed it plentifully, and give it a dose composed of the flour of sulphur, balsam of sulphur, syrup of coltsfoot, and oil of sweet-almonds, of each an ounce, blended together. If the above treatment produce no visible alteration in eighteen hours, repeat it. Probably any other purge would answer, as well as the above. Let the beast be kept comfortable, and have some exercise every day, till it recover.

The *locked jaw* is similar to that in the human frame, is caused by similar means, and requires a similar treatment. If the beast be hardy, opiate frictions, and dashing on of cold water, is recommended. If it be of slender constitution, opiate frictions, and warm fomentations of the part affected, is directed. As the beast cannot swallow, let gruel be poured down its throat with a horn, till the disorder is removed.

The indications of *colds* in cattle, to which they are mostly liable in the Sgring, are hollowness of the flanks, roughness of the coat, heat of the breath, and runing at the eyes.

House the beast, keep it warm, and if it be very feverish, bleed it pretty freely, and let its drink be warm, and have some nitre dissolved in it. Expose it to the air, at first, in the middle of pleasant days, when recovering.

Cattle are sometimes poisoned by eating poisonous plants, or by being bit with Mad-dogs, &c. In the latter case, if the wounded part be cut away shortly after the bite, and then be kept open for some time, it is, perhaps, the only effectual remedy. Dr. *Crouse*'s prescription for curing the bite of Mad-dogs, as made public in pursuance of a law of this State, is believed by many to be effectual, and is certainly worth the trial. It is believed, that any medicine which is very strongly anti-spasmodic, if given plentifully, and in proper season, will counteract the effects of the bite of mad animals.

For the bite of Rattlesnakes and most other vipers, a plentiful dose, and repeated when necessary, of olive-oil, has been found effectual, in most cases.

Other diseases of Neat-cattle, it may not be amiss to mention, which have, at times, prevailed in particular places. Some years since, a very fatal disease, which principally attacked Calves in the Fall, and yearlings in May and June, and sometimes older cattle, prevailed in Connecticut. It was called the *mortification*. Those in the best condition were most liable to it.

Its symptoms were, an aversion to move, a swelling, most commonly in the region of the kidney, but sometimes in the shoulder, leg, flank, or side, &c.; and in a short time the beast died with little pain, but with a very fœted smell. On examining the swellings, they were found to contain a jelly and black blood. The cause was ascribed to fulness of habit, and a too-sudden change from indifferent pastures, into such as were very rich. Bleeding was recommended as a preventive. No cure was discovered.

A disease, something similar to the above, prevailed, about sixty years since, in the north of England, which was commonly called the *black quarter*. Bleeding was found a preventive; but in very few instances was a cure effected, after the beast was seized with the disorder. This was ascribed to too much succulent food, when given to beasts of full habit.

It would seem, generally, that cattle in a plethoric state, when overfed with rich food, or when too suddenly surfeited with it, are suddenly indisposed, and carried off before relief can be given. There are, however, epidemics among cattle, as well as among Men, the precise causes of which may oftentimes be difficult to ascertain. Generally speaking, it is believed, that among the horned race, either plentiful bleeding, or purging, or both, will be found a preventive, and in most instances a cure, of the maladies which are usually most fatal to them, from too full habit.

When Oxen are long and hardly drove in muddy roads, particularly where the soil is calcareous, they are liable to a soreness between their claws. This will make the beast lame; and, when discovered, the part should be cleansed, and healed with some proper ointment. Sometimes, from inattention to this, the part becomes horny; in this case, the hard parts must be cut away, and the wounded flesh cured.

A general indication of health in Neat-cattle is a moist or wet nose, and when this is found dry, it is a certain symptom of disease of some kind or other.

Cows have some diseases which are peculiar to them; such as those attendant on calving, and such as affect the udder, &c.

The udder is divided into as many apartments as there are teats, so that if one or more of these are diseased, this does not affect the rest. The milk of one teat may be good, and that of another bad. The udders of Cows may be injured in various ways, and swellings and inflammations are the usual consequences. These must be removed, or the beast will be in danger.

Mr. *Deane*, speaking of hard swellings in the udder, which he calls the *garget*, recommends making a rowel or seton in the dewlap, and inserting therein a piece of the root of *mechoacan*, as large as a nutmeg, with a string fastened to it, so that it may be drawn out when the cure is effected; and this, he says, will cause a revulsion of the humor in the udder into the orifice in the dewlap, where it will be discharged. When the cure is effected, the piece of root is to be drawn out by the string. Probably a common rowel, placed in the breast or dewlap, would answer the same purpose.

Where hard tumors have formed, the Compilers of '*The Complete Grazier*' recommend, to take of common hemlock (*conium maculatum*) dwarf or roundleaved mallow (*malva rotundifolia*) and common millilot (*trifolium millilotus*) of each a handful, and boil them in water; with this wash the tumor, after it has opened; the water to be as warm as the beast can bear it; and, after thus cleansing the part, cover it with a plaister of basilicon ointment.

The following is also recommended in the lastmentioned work, in obstinate cases of ulcerated udders: Take gum-ammoniac, gum-galbanum, castilesoap, and extract of hemlock, of each one ounce; form them into eight bolusses, and give one every morning and evening.

It is observed in the same work, that internal remedies are always necessary where the udder and teats are considerably inflamed, and for this purpose another internal medicine is mentioned, *viz.* Four ounces of nitre mixed with a pound of common salt; give two table-spoonfuls of this, powdered, in a gallon of thin watergruel, every three hours.

Where the inflammations are less violent, and exhibit no symptom of increasing rapidly, it may answer to annoint the udder frequently, during the day, with fresh butter; or with a salve made of an ounce of castilesoap, dissolved in a pint of sweet milk, over a gentle fire; or with an ointment made with the juice of the leaves of the thorn, mixed with hogslard; or the tumor may be annointed with a little mixture of camphor and blue ointment; and let about half a drachm of calomel be given, in a hornful of warm beer, if the malady increase.

Where the teats are only sore, they may be washed with soapsuds, and rubed with an ointment made of whitelead and goosegrease; or fresh butter would, perhaps, do as well.

The proper position for the Calf to lie in the calf-bed has already been mentioned; where, therefore, it is not presented in this position, at the time for its birth, and by reason of this the Cow cannot deliver her burden, it becomes necessary, if possible, to place it properly. Where this cannot be done, the method of extracting it by a hook fixed in the under jaw, as before mentioned, may be frequently successfully practised.

Sometimes the hind parts of the Calf are foremost; and in this case it is best to extract it in that position, by proper force used for the purpose. Whatever assistance, however, may be requisite in these cases, should be given with care and judgment, minding to hurt the Cow as little as possible.

Another impediment to calving, as noticed in the last-mentioned work, is owing to a part of the natural passage becoming of so horny or firm a texture, that it will not yield or distend. When on due examination this is found to be the case, insert a sharp-pointed penknife, with the forefinger to the back of it, to guide it correctly, and with this carefully cut the horny circle through, which will immediately give the animal the requisite relief, if proper assistance be also given.

In this case, as in others where the passage is wounded, or torn, it should be bathed with a pint of camphorated spirit of wine, injected with a syringe; the beast should be housed and kept moderately warm, and well and dryly littered, and be fed with wholesome nourishing food, and with drink a little warmed.

The *falling down of the calf-bed* frequently happens after a laborious birth; though some Cows are naturally disposed to this disorder. Where this is apprehended, it is directed, in the lastmentioned work, that the Cow should be carefully watched, and the placenta, or cleaning, removed without effusion of blood. After which the Operator may gently replace the calf-bed, taking care not to withdraw his hand till the former begins to feel warm.

The following draft may then be given: Of bayberries, pulverized gentianroot, and corrianderseeds, each an ounce; of aniseed and juniperberries, each two ounces; together with half a pound of treacle, and the whole put into three pints of strong beer. After this, it is advisable to lead the beast gently down a hill, if one be near, which will assist much in placing the calf-bed in its proper place, and render the application of stays to the womb unnecessary.

Where the calf-bed, however, comes down, and no immediate aid can be had, the parts exposed should be laid on, and kept covered with, a linen cloth; and, when replaced, bathed with a mixture of new-milk and spirits; after, which, the above treatment may be pursued.

Some Cows have a peculiar shape of the hinder parts, which tends to produce this malady; and, in such case, it is perhaps difficult to prevent it, unless it can be done by keeping their hinder parts higher than usual, while confined to their stalls, about the period of gestation.

The *puerperal fever* is caused by taking cold, while calving. Cows thus affected should have housing and good treatment, as has been directed in other cases, and the head should be placed highest, in order to assist the natural discharges. In other respects, they should be treated as in cases of violent colds, except that no blood should be taken, unless, perhaps, in violent cases, and then only at the commencement of the disorder.

Close attention should be paid to Cows, as well as to the females of other kinds of cattle, about their periods of gestation. They often then stand in need of some skilful aids, whch, if rendered in due season, may save their lives; and which, if not thus afforded, may be of essential loss to the Owner.

Calves are also liable to some diseases, and, in some Countries, to such as do not prevail in others. In this, it is believed, they are subject to but few. One, however, which frequently attacks them, is *looseness* or *scouring*. It is sometimes caused by their having the milk of the Dam too soon; sometimes, by too frequent changes of the milk which is given.

One method of cure is to stint the animal of its food, and give it once or twice, while fasting, a hard boiled egg, mashed fine and well mixed with its milk. Another directs, that powdered chalk, mixed with wheat-flour, and made into balls with gin (brandy would seem to be better) be given the animal, as a safe medicine.

Calves are also liable to *colds;* in which case they should have a treatment similar to older Neat-cattle.

We have read a theoretical essay, of the late Dr. *Rush*, on the diseases of cattle, writen with his usual ability. His theory is this: That similar causes produce similar diseases in the Human, and in the brute, creation; and that the most proper cure for the disease, in either case, is pretty much the same. He also contends, that the diseases of each are often simultaneous; produced by the same generally-prevailing causes.

We are aware, that the most eminent of the Descendants of *Aesculapius* have laid the foundation of their fame on some new theory, often more or less incorrect; but we are induced to concede to this, as being fundamentally true, and worthy of due consideration by all who attempt the healing art, upon cattle of every description.

We shall merely add, that in Norfolk county, in England, which is famous for its numbers of Neat-cattle, the *polled* breed is in almost universal use. The Cows of this breed are excelent milkers; and their inability to be mischivious, from their want of horns, would seem to entitle them to a preference.

Mr. *P. Cooper*, of Newjersey, however, deprives his horned cattle of their horns, when he thinks proper, by taking the Calves, when about a month old, and the horns have risen above the skin, and cuting off the knobs close with a chisel; then, with a sharp gouge, paring them off clean to the bone, searing the wounds thus made, and filling them with hogslard, which completes the operation.

In the foregoing observations, which are rather miscellaneous in point of form, no attention has been paid to the various terms which many English Farmers and Graziers apply to cattle of different kinds, ages, and conditions, further than such terms are usual in this Country. We have plain English enough for every purpose of this kind; and there is no need of Farmers having a vocabulary for cattle, consisting of barbarous words, which none but themselves would be likely to understand.

NETTLE *(Urtica.)* It is said, that this plant is more productive in fibre, than hemp, on a given quantity of ground. That the texture of its fibre is finer and stronger, than that of hemp, has been long known to the early Settlers on the Mohawk river; as this plant greatly abounded in the rich, mucky, new lands in that quarter, before they were cleared. As much as thirty years ago, we have seen cloth made from the nettle, which appeared to be as soft as that made of flax.

The plant seems to grow most naturally in moist mellow loam, which contains a large proportion of vegetable earth. It may be raised from the seed, or the root, as it is a hardy perennial.

Mr. *Greene* says the seed should be sowed in the Spring, and that the roots should be planted in the Fall; that, if the fibre is wanted for the finest fabrics, the plant should be cut while in full flower; but, if only for common use, it will yield more by standing till fully ripe; that, after being cradled, which is the most proper way to cut it, the stalks should lie on the ground, in order that their stinging quality be thus removed; that it is roted in the same manner as hemp, but requires a longer time for this purpose; and that it is not affected by the inclemency of the weather.

It is believed that this plant may be cultivated to great advantage, particularly in soils where it grows in its natural state.

It should, however, be observed, that the culture of it has been patented by Mr. *Whitlow;* but, how far the knowledge that has long existed, in regard to its valuable qualities, may interfere with his supposed right to monopolise its culture, we pretend not to say.

That superior intelligence, however, which may have enabled him to perceive the value of the plant, when properly cultivated, and to excite public attention in its favor, entitles him to particular consideration, and the thanks of his Country.

NEW HORSE-HOEING HUSBANDRY. In the year 1731, Mr. *Tull*, an ingenious Farmer of Greatbritain, published a book under this title; and, afterwards, further supplementary essays on the same subject; the object of which was, to introduce a new system of husbandry, particularly in the culture of wheat. His method is this:

The ground is ploughed into ridges of about five, six, or seven feet wide, and then smoothed with the harrow; then the seed is sown in straight lines by a drill in small furrows, about two inches deep; two of these furrows being placed together, at the distance of about nine inches, with an interval between these and the next two of about two feet; so that a horse-hoe, or a horse-plough, can be run between them. As the seeds are droped by the drill-plough, they are covered by little harrows, which are fastened to the plough, and follow after it. The horse-hoe has already been mentioned.

After the plants of wheat have got to a proper size in the Fall, the horse-hoe, or plough, is run close to the plants, on each side of the double rows, and the furrows are turned from them; and thus, Mr. *Tull* says, the growing grain should be left during Winter; it being, by this process, laid so dry, that it will be in no danger of being thrown out of ground by the Winter-frost.

Early in the Spring, the earth is to be turned to the rows; then in May, from them; and in June to them again. Some weeds, which will rise between the double rows and round the stalks, must be taken out by hand.

This culture, Mr. *Tull* says, is equally well applied to barley and some other kinds of grain. For barley, it has been found to answer very well here; but for wheat, in particular, it will not answer. It makes this grain grow so rank and thrifty, and continue so much beyond the usual time in the green state, that it generally becomes blasted or mildewed. Probably the same fate would, in some measure, attend this kind of culture, with regard to rye, if a culture so expensive could, in this Country, be afforded to that grain.

Mr. *Tull*'s leading principle is, that frequent ploughings have the same effect on lands as manuring; and this, in general, is believed to be correct, though not equally so in all soils; that by this constant ploughing, or horse-hoeing, the lands will be sufficiently and constantly manured; that soils not very rich can, in this way, be made to produce very large crops; and, what is sometimes important, they can thus be made to produce the same crops every year; as the ground is ploughed up again, as soon as the grown crop has been harvested.

Although the husbandry of Mr. *Tull* will probably never come into general use in Greatbritain, where, from the coolness of the Summers it will always answer best; yet, the drill-plough, and the method recommended by him, of ploughing among plants, are each founded in an accurate knowledge of good husbandry; and the latter will ever be found best in the cultivation of many plants; such as beans, Indian corn, carrots, cabbages, potatoes, &c.; and, no doubt, barley, and probably some other kinds of grain, may in this manner be successfully cultivated.

Mr. *Deane* says he has cultivated barley in this way, and never had less than forty bushels to the acre.

NURSERY. It would seem to be the better plan, to make a nursery on such ground as is but illy suited to the growth of the trees to be raised; for, by afterwards placing them in a soil that is natural to them, they will grow more thriftily, than trees raised in a nursury where the soil is suitable to their growth.

See ORCHARD, for a case mentioned by Mr. *Peters;* and also, PLUMTREE, for another mentioned by Mr. *Livingston;* where this point is more fully illustrated.

Let the ground be ploughed very deeply, early in the Fall, and be well mellowed; then lay the seeds, or stones, along in straight rows, and let them be laid plentifully, in order that enough may come up. The next year, they are to be thined, so as to stand at proper distances, and the ground is to be kept hoed, and clear of weeds and grass. After they have had one Summer's growth, they may be cut off near the ground, for grafting.

See GRAFTING.

Inoculation, may also, at this growth, be successfully performed on them.

See INOCULATION.

They should afterwards be kept clear of weeds and grass, by hoeing among them, until they are transplanted.

Where snows fall deep, they art apt to bend down the young trees, and make them crooked. The best remedy for this is, to drive down stakes, proportionate to the height of the young trees, and tie them to these in such manner, that the bark will not be injured by the string, nor by rubing against the stakes. This is to be done after grafting them.

Some sow the seeds, or stones, on a small spot, and afterwards plant them out in the nursery. This may be best for stone-fruit; but, for appletrees, sowing the seeds in the pumace is the easiest method, and answers as well as any; and for other seeds, or for acorns, if oaks are to be raised in a nursery, the above method will answer very well.

Many trees are propagated from the slips, or cutings, such as the Lombardy-poplar, mulberry, and others.

For raising appletrees, in this way, *see* SLIPS.

NUTRIMENT OF FOOD. The parts of food, whence nourishment is derived, consist of gelatine, albumen, and the saccharine matter.

In a course of Lectures, delivered by Mr. *Davy*, before the Board of Agriculture, in England, he pointed out, from his own analysis, the quantity of nutritive matter contained in various seeds, roots, and grasses, used as food for Man or beast.

From this, it appears, that the best wheat contains ninety-five parts in one hundred of nutritive matter; good barley, ninety-two; rye, seventy-nine; oats, seventy-four; peas, and beans, fifty-seven; potatoes, twenty-five; beets, fourteen; carrots, nine; turnips, from four to six; clover, four; fiorin, six; and other grasses, from two to five.

Wheat weighs sixty pounds to the bushel, and turnips about forty. Thus, it would seem, that as much nourishment is to be derived from one bushel of wheat, as from about twenty-seven of turnips. This, however, is not the case.

What is called the stimulous produced by distention must be taken into the account, in forming a proper estimate of the effects produced, in supporting life, by any kind of food; and it is on this account that, perhaps, fourteen bushels of turnips, particularly when boiled, would sustain life as long, or faten as much, as one bushel of wheat.

O.

OAK *(Quercus.)* Mr. *Green*, in his 'Catalogue of plants indigenous to the State of Newyork,' enumerates fifteen different kinds of oak, *to wit;* the common white, the swamp, the yellow-chesnut, the scarlet, the Spanish downy-red, the long-stalked, the scrub or barren, the large-fruited, the rock-chesnut, the rock, the mossy-cup, the various-leaved, the black-jack, the post-white, and the pinoak.

With some of the above kinds we are not acquainted. The black-jack abounds in the middle States.

There is also the liveoak of the Southern States, which is uncommonly hard, when dried, very durable, and esteemed the best for shipbuilding.

The swampoak is very firm, tough, and durable; and, when cultivated, it should be in such grounds as those in which it naturally grows.

The whiteoak, which grows in moist uplands, is of rapid growth, firm in texture as any of the northern oaks, and is mostly cultivated.

The liveoak should be cultivated where it naturally grows.

See Forest, for an approved method of cultivating the oak.

It may also be planted in nurseries, and then transplanted, at pleasure.

Mr. *Forsyth*, in speaking of those which are raised in nurseries, says, it is a generally-received opinion, that when an oak looses its tap-root, in transplanting, it never produces another; but this he found to be a mistake. He transplanted a bed of oak-plants into a fresh bed, cuting off the tap-roots near the small fibres shooting from them. The second year afterwards, he *headed down* one-half of the plants, and the other half he left to Nature.

For his method of *heading down*, *see* FRUIT-TREES.

During the first season, those which were headed down made shoots six feet in length, and covered the tops of the old stems, leaving only a slight cicatrix; and produced new tap-roots upwards of two feet long. The others, which were not headed down, did not grow to one-fourth of this length. He further says, that when the former were eighteen feet high, the latter were only five. This case is cited by him, as a striking instance of the superiority of his method of *heading down* over the common method of managing trees.

His method of curing or restoring old, hollow, and diseased trees, which are partly dead, is also generally applicable to the oak.

For the method of doing this, *see* also FRUIT-TREES.

The Farmer, who finds his stock of good oak-timber growing more scarce, should turn his attention to the means of replenishing his farm with this valuable timber. When planted on little heights and declivities, he may find the growth of oaks ornamental to his farm, as well as profitable, by raising its value; and it may afford him much pleasure, in his more advanced years, to observe their increased dimensions, while in his mind he rolls back the wheels of time to that period when the oaks were but acorns in his hand.

The bark of the whiteoak is best for taning. The inner bark of it, when reduced to a powder, and administered in the manner of the Peruvian bark, answers nearly the same purpose; but the doses must be larger.

The juice of the galls of the shruboak is excelent, for making the best ink, and is also a component part in black dyes. They are formed by an insect's depositing its eggs in the tender rind of the twigs of the tree; and, through the wound thus made, this black juice oozes, and forms a tumor, sometimes as large as a walnut, in the heart of which the young insect is to be found.

The acorns for planting, for raising the oak, should be gathered as soon as they fall in Autumn, and kept in moist sand during the Winter, in a place where they will be free from frost; and those only which have sprouted should be planted the next Spring. The sprouts should not be suffered to dry, before the acorns are put in the ground.

A strong moist soil is requisite for raising the common whiteoak, to perfection. Grounds for raising the best oaks, of any kind, should always be those where they grow most thriftily, in a state of nature, if such can be always ascertained.

OATS *(Avena.)* The clear profits to be obtained, from this crop, can never be very great; for, although fifty and sometimes sixty bushels may be raised on an acre; still the value of the crop, according to the usual price obtained for oats, is of no great amount. Their principal recommendation is, that they are an excelent food for Horses, particularly in traveling, being of a loosening nature; while most other grains are binding.

Oats require a soil, and a climate, sufficiently moist. Dry, gravelly, or sandy soils are the most unfit for this grain; and particularly where drought is apt to prevail, during the growing of the crop.

In most climates, it is best to sow oats as soon as the ground can be properly prepared in the Spring; but, where drought is not to be expected, they may be sown at any time that will enable the crop to ripen before the close of the season.

The crop should be harvested rather green, as this makes the straw much better for fodder, without any injury to the grain. Gypsum is a suitable manure for the crop. It is usual to sow two bushels of seed to the acre; but we have seen very good crops raised, where only half this allowance of seed was sown. Probably, about a bushel and a half is sufficient.

Oats are usually considered as being rather a scourger of the ground; but we believe this is a mistake. We have seen a piece of land, which was intervale, however, sowed eighteen years successively with this grain, without manure, and without any sensible diminution of the crop.

At the same time, when wheat is sown immediately after oats, the latter crop will be lessened more in product, than by any other crop which could have preceded it.

As it is usually thought necessary for every Farmer to raise some oats; and as the crop can never be very profitable, unless attended with but little labor; perhaps the best plan may frequently be found, to select some suitable ground, and keep it yearly sown with this crop; particularly where gypsum can be profitably applied as a manure.

Let the gypsum be sown on the ground after the crop is harrowed in. As soon as it is harvested, this manure will produce a growth of white-clover, which will be of considerable value for Fall-feeding.

Early in the next Spring, turn the ground carefully over, harrow another crop, and sow gypsum as before; and so on, year after year. Let the ground be ploughed but one way; let the lands be of uniform width, and the gathering and parting furrows alternate, as directed under article PLOUGHING.

The quantity of gypsum to be applied, yearly, should be such as will produce the largest crops which can grow, without lodging; and these will probably average about fifty or sixty bushels to the acre.

This method, where the ground is suitable for the purpose, will, as we believe, yield the utmost profit that can be realized from the culture of oats.

It may be advisable to steep the seed, before sowing, in some fertilizing liquor; such as a solution of saltpetre, or old urine kept for the purpose, or lie of wood-ashes, or all these united; and then dried with a sprinkling of gypsum.

See also, Barley, for another successful method of steeping that grain, before sowing, which, no doubt, may be found equally beneficial for oats.

A change of seed should also be attended to; for this grain, like most others, degenerates by long sowing in the same place.

In whatever way oats are cultivated, they require the ground to be well stired up and mellowed, and to be in good condition. It is a mistaken notion, though entertained by many, that slight culture will answer for this crop, or that this grain can be cultivated, to any advantage, in poor lands, without manure.

Several kinds of roots may be made very good substitutes for oats, for feeding Horses, at home particularly; such as carrots, potatoes, when steamboiled, turnips, Jerusalem artichoke, &c. Pumpkins are also excelent for this purpose.

It is also believed that clover-hay, when steamboiled, would nearly of itself keep Horses in good condition, during the Winter season.

See Steamboiler, Pumpkin, and the articles treating of the roots just mentioned.

OLIVE (*Olea.*) This tree is famous for the production of oil. It thrives well in Italy and the southern parts of France, and, it is believed, it would grow well in some of the Southern States. The Winters here are too severe for it. We have, however, a plant which is said to be an excelent substitute.

See Sunflower.

It has been found, in France, that immersing the olive-fruit in vinegar, before pressing out the oil, will improve the quality, and add a tenth more to the quantity.

ONION (*Allium.*) This root requires a mellow, dry soil, and the richer the better. The soil may be a rich sand, sandy-loam, dry-loam, or gravelly-loam, or either of these earths, of common quality, when strongly manured, will answer. The rich black earths, and mucky grounds, of the more northerly and westerly parts of this State, are good for this root.

We have seen it successfully cultivated in light, black, swampy grounds, when laid sufficiently dry by small open ditches, about three rods apart.

In the parts of this State which we have just mentioned, the onion affords very productive crops; and a great proportion of the soil may be fited for its culture. From four to six hundred bushels of this root may be raised to the acre.

The ground selected for this culture should be perfectly clear of stones; and, if it contain seeds of weeds, these should be first eradicated by an effectual Summer-fallowing. The ploughings, however, for preparing the land, in the first instance, need not be deeper than perhaps about three inches.

If the ground be suitably mellow, any further ploughings, for succeeding crops, will be unnecessary; all that will be found requisite will be, to remellow the ground as deeply, and effectually, as it can be done by a heavy irontoothed harrow, having the teeth well pointed, and turning forward, so as to run about two inches deep.

But, where the soil is not naturally of the mellow kind, it will probably be found best to give the ground one even shallow ploughing, and then to make it perfectly fine with the harrow, as before mentioned.

Whatever manure is applied, should be very finely roted, clear of the seeds of weeds, and should be well mixed with the surface of the soil, by the harrowings.

After the surface has been finely pulverised with the harrow, the ground should be rolled, and then it will be fit for the reception of the seed. The sowing should be as early as the ground can be completely prepared.

The common method of commiting the seeds to the earth is pretty well understood; but this is a tedious operation. The seeds should be drilled in, in rows about ten or twelve inches apart, by a small hand-drillplough, made for the purpose, as described under DRILL-HUSBANDRY.

This machine may be made to drill in two rows at once, which would enable one Hand to go over, perhaps, two or three acres in a day. The seeds should be drilled in pretty thickly, for fear they may not all vegetate, and covered about half an inch deep. If the growing plants are found to stand too thick, they must be thined by hand, when the first weeding commences.

This is the most laborious operation in the whole process of raising this root, as well as some others; but here we propose another laborsaving implement, in the shape of a small hand-weedingplough, which is described under PLOUGH. This is to be pushed along by hand, runing furrows on each side of the rows, as near as may be found advisable; turning the furrows first from the rows, and then back to them, in order the more completely to throw all the roots of the young growth of weeds out of the footing they may have got in the soil.

Every part of the interval between the rows should, in this manner, be cut with this plough; after which it would probably be found requisite to use a small narrow iron-toothed rake, for the purpose of completely separating the roots of the weeds from the soil. When this has been performed, the cleansing of the rows of the weeds growing among them, which the plough could not touch, and also the thining of the rows, must be performed by hand.

When the weeds begin to rise again, this operation must be repeated, and again, if it be necessary, as no weeds should be suffered to grow among the crop.

Old grounds never can be completely cleared of weeds, as some kinds seem to grow spontaneously; but, where none are suffered to go to seed, the trouble of extirpating such as do rise will not be very difficult.

In raising this root, some plant them in holes, about ten inches apart, so as to form rows each way, puting about eight seeds in each hole.

This, where the cultivation is all performed by handlabor, is the easiest, both in seeding the ground, and afterwards in weeding it, as the weedinghoe can be run each way between the bunches or hills; but the product will be found the greatest, where the crop is raised in rows, whether drilled in, as above directed, or planted by hand.

By the use of the drill, and weeding-plough, as above described, in raising the crop, it is believed that one-half of the labor usually bestowed on the culture of this root would be saved; and that thereby the Farmer could probably afford his onions for about thirty cents a bushel; a sum which is not more than a third of the price they usually command in our markets.

The culture of this root, upon somewhat of an extensive scale, and agreeably to the above directions, would, no doubt, be found very profitable in some situations, where a ready market could be had for the crop, and where the soil was suitable for its cultivation.

When the stalks have become dead and dry, the onions will have ceased to grow, and then they should be pulled, and laid on the ground some days, to dry and harden, before they are carried in.

Those which have thick necks and the bulbous part small, and are commonly called *scallions*, may as well be left in the ground during the Winter, as they will continue green till that time: They will stand the frost; and the next Spring will grow in their places to be good onions; or they may then be taken up and set in a bed made for that purpose. At all events, they are good for nothing, without a second year's growth.

There is a kind of onion which, instead of bearing seed, bears bunches of small onions on its top, and these being preserved, and set out the next year, grow to be large, and their tops again bear the small ones. Probably these are best calculated for more southerly climates, though they grow very well in this.

In the Fall, after the onions have been dried, and the tops cut off, they are to be carried in and spread over a floor; and, at the commencement of cold weather, put into casks, and set in a place where they will not freeze. A little freezing, however, will not essentially injure them. The place where they are kept, should not, at all events, be too warm and moist, as this will cause them to rot. If they be kept where they are somewhat frozen, they should not be disturbed in their frozen state; but the better way is, not to suffer them to be frozen, but to keep them in a temperature a little above the freezing point.

Those which are shiped from Newengland, for market, are usually tied up in wisps of straw, and if they be hung up in this way they will, perhaps, keep longer than any other. If they incline to sprout, sear the roots with a hot iron, which will stop their growth.

To obtain seed from the onions, plant them in the Spring in beds, about nine inches apart. Take the largest and soundest for this purpose, and keep them clear of weeds while growing. When they have come to a head, tie them loosely to stakes drove down for that purpose; otherwise they will fall to the ground, and then the seeds will not come to perfection.

A bed thus prepared, and cultivated, will last many years; and the seeds which it produces will be better as the bed grows older. For the purpose, however, of preserving the bed, it must be protected from the severity of the Winter, by covering the onions over with earth, to the depth of about three inches, or more if requisite; and, in the Spring, they are to be uncovered again. If any of them happen to die, their place is to be supplied by seting others in their stead.

It is said that soot, and ashes are, each, very good manures for onions. Apply these when the bulb begins to form.

Mr. *Deane* says he tried common sea-salt upon them, without effect; but perhaps the manner, or time, of the application, or the quantity applied, was improper.

We are unacquainted with the particular effects which gypsum would have upon this crop; but, most probably, one evil effect it would have would be the spontaneous production of white-clover.

It is most probable that well-roted and fermented composts, formed of such materials as are most suitable to the soil, will always be found the best manure for this root; and, in order to ensure the greatest crops, the manure should be plentifully applied.

Onions are not an exhausting crop; and they may be constantly raised on the same ground.

It should be added, that some are in the practice of beating down the tops, after the roots have attained considerable size, for the purpose of making the latter grow the faster; but the practice is undoubtedly injurious, as we have seen confirmed by experiment.

In all the States, more southerly than that of Newyork, it has commonly been found necessary to give onions two years' growth, in order to rear them to a suitable size.

We perceive, however, that a method has lately been adopted which enables the Cultivator to rear a crop every year, on the same ground. This is, to sow the crop about the 10th of September, and let it stand over Winter, and then it will come to maturity the next season, in time sufficient to take it off, and sow the ground again.

This has been successfully practised by Mr. *Peters*, and by Mr. *Philips*, of Pennsylvania.

ORCHARD. The most suitable soil, for almost every kind of tree grown in the orchard, is that which is warm, dry, and fertile. Even light sandy lands are better for the purpose, than stiff clays. It is most advisable to make use of hilly or uneven grounds, if the soil be suitable, and let those which are level be reserved for the plough.

The first step toward making a valuable orchard is, to prepare a nursery of young trees, of the best kinds of fruit, and such as are most suitable for the uses to which they are to be applied.

For an orchard of peach and apricot-trees, *see* PEACH-TREE, and APRICOT.

Trees of this description should never be planted with those of a larger growth. The appletree and the peartree may grow very well together; and an orchard of these, as being the most durable, and susceptible of being applied to more valuable uses, is, generally speaking, entitled to the first consideration.

The juice of the peach and apricot may be distiled into a brandy of pleasant flavor; but all ardent spirits are great destroyers of the Human Race. Liquors of the vinous kind are much less hurtful to the constitution; but far from being innocent, if taken to excess.

In the Letters of *Espreilla*, mention is made of a famous peartree, that grew at a place called Teignton, in England; that from this tree many others of the same variety were raised, by engrafting; and that the perry made from these trees had frequently been sold, in London, for *Champaigne*.

See further, PERRY.

Mr. *Cooper*, of Newjersey, has made a liquor from the juice of the apple, with other ingredients, which, by Connoiseurs in wine, passed for it, and was considered of excelent quality.

See WINE.

Liquors of such quality are not, however, to be made from the most common sorts of either pears or apples. The choicest kinds of fruit must be selected for such purposes. In searching for fruit-trees, whence scions are to be taken for grafting, in order to raise the most valuable fruit-trees, regard should be had to the four following particulars: First, that the trees bear the best of fruit for making either cider or perry; second, that they ripen at different times; third, that they bear plentifully; and, fourth, that they bear every year.

Trees possessing all these qualities are not every where to be found; but they should be sought for; and, whenever found, they alone should be used for obtaining a supply of scions, whence to take limbs to make trees after the Chinese method, which we shall presently describe.

Trees may be found which bear excelent fruit for making cider, or perry, and which, when grown to good size, will each yield, yearly, from twenty to thirty bushels, or more; which is perhaps five times the quantity that the common sort of such trees usually bear. This is surely a sufficient inducement to search for the most valuable fruit-trees, when planting an orchard, instead of planting in the common way.

For the different methods of grafting, *see* that article.

The Chinese method of raising any particular kind of appletree is as follows: Take a limb, of suitable size, of the tree selected, and take off the bark all round it, to the width of an inch; round this place plaister a bulb of loam, say, of the diameter of eight or ten inches, and bind it round with old cloths, or tow, and strings to keep it to its place; immediately above this place a vessel, filled with water, with such a leak in its bottom as will constantly afford such droping of the water as will keep the bulb sufficiently wet; and as the water leaks out of the vessel let it be again replenished.

In a given time, roots will start from the limb, above the place where the bark is taken off, and extend into the bulb; and, when they have grown sufficiently, saw off the limb, below the roots, and plant it where it is to grow. Let it be fastened, with a cord, to a stake drave slanting into the ground, to keep the new tree steady, until such time as its roots have extended sufficiently for that purpose; minding, at the same time, to keep the stake from rubing against the bark.

This process is to be commenced at a time suitable for having the young tree planted at the proper time in the Fall

This plan will, no doubt, answer equally well for pear-trees. The limbs, selected for the purpose, should be taken from young trees, as soon as their character for fruit and bearing is known; if it be true that either limbs, cutings, &c. will live no longer than their parent stock.

See CUTINGS

It is advisable to have several different kinds of cider-apples, and pears for making perry, in the orchard, and some which ripen sooner than others, in order that more time be allowed for making these liquors; but it is believed best, not to mix different sorts of either together, in making the cider or perry.

See CIDER, and PERRY.

It is observed, in the Letters of *Espreilla*, that, in some of the cider-counties in England, the appletrees are not grafted at present; but, for rearing young trees, the *largest* seeds which are found in the *south* side of the *largest* apples, as they hang on the trees, and these of the best selections for fruit, are only used for planting; and that from such seeds appletrees are grown, which produce either the same kind of fruit, as that whence the seeds were taken, or other kinds nearly or quite as good.

Probably it may be found best to plant the seeds, before drying, after they are taken from the apples; and for the same reasons that the stones of peaches are directed to be planted in that way A few experiments would readily ascertain the truth of these matters.

There is another way of obtaining a much better orchard, than the common method of planting trees, without grafting, is calculated to afford: This is, to set out the trees very close, say, not more than eight feet apart, and without any regard to rows. As soon as they begin to bear, the character and value of each tree is readily to be known; and as soon thereafter as may be necessary, let the most worthless trees be taken away, and repeat this operation, as the remaining ones increase in size, so as to give the growing ones at all times sufficient room.

In this way, not more than one tree out of six will be left standing, when the orchard has acquired a large growth; and thus a chance is afforded, of selecting the best tree out of every six first planted; while, at the same time, the orchard in its infancy affords a much larger product of apples; and the trees, as they are taken away, are of some value for fuel.

Some may object to this plan, that the trees would stand too thick, at first, for ploughing; that they would not stand in rows; and that, when the poorest trees were taken away, those left standing would be at more unequal distances, than when at first planted; as two or more good trees might often be found together, and sometimes too many poor ones.

The latter objection is the only one of consequence; and it does not possess much weight. Two good trees, where found next each other, may be left standing; as the growth of their limbs will so far become adapted to their situation, as to seek room to grow where most room is to be found; and, where too many poor trees are found together, they may be all taken down, and have their places supplied with grafted trees, selected for the purpose, or with limbs converted into trees, after the Chinese method just mentioned.

Whether the trees stand in rows, or otherwise, is a matter of no consequence, further than as it regards ploughing among them; and we never should advise to plough an orchard, more than two or three years after planting: For, if continued longer, the shade of the trees, and the extension of their roots, will impede the growth of the crops; while, at the same time, the roots, and the bark are apt to be injured by the operation of ploughing.

All that is really necessary, to make a young orchard grow thriftily, is to plant it in a good suitable soil, and to keep the ground clear of grass and weeds, for some little distance round the roots. Orchards which are never ploughed, endure the longest.

Let them be kept as pastures for Calves, for Swine; and Sheep may be safely admited, even among young trees, by taking the precaution to give their bodies a coat of lime over the bark, with a brush; or a coat of Mr. *Forsyth's* composition of fresh cowdung, old urine, and soapsuds; either of which will, as is believed, be found a sufficient security against the depredations of Sheep on the bark of the trees, or of insects on the leaves.

It is perhaps almost unnecessary to observe, that larger cattle, which can reach up to the limbs of the trees, should never be suffered to go into the orchard.

We will suggest another method or planting an orchard, which we be believe would be advantageous. Take young trees of the best selected fruit, obtained by grafting, or otherwise, and set them in rows, at the distance of ten feet each way.

After they have borne about six years, their increased dimensions then requiring more room, let every other tree, in each row, be cut down; so as that those left standing will be in the quincux order, at the distance of about fourteen feet.

After these have stood about ten years more, let every other one be again taken away; and those remaining will then stand in their first order, at the distances of twenty feet.

When they again require more room, repeat the operation; and this again brings those left into the quincux, at the distance of about twenty-eight feet, which is sufficiently far apart for large trees.

The advantages of this mode of culture are, that, as soon as trees begin to bear, the same extent of ground will yield nearly as great a quantity of fruit, as when the trees are full grown, but fewer in number; the trees cut away will be of considerable value for fuel; and less ground is, in this way, sufficient for more constantly affording any given quantity of fruit.

The principal disadvantage of the plan is, that about one hundred and twenty trees more to the acre will, in the first instance, be required; which, if the Farmer raises and grafts his own trees, instead of purchasing them, will be about twenty dollars to the acre, of additional expense; a trifle, when compared with the advantages before mentioned.

Mr. *Coxe*, of Newjersey, planted eight orchards, in different ways; and he found that which was planted in the manner following, to flourish much beyond all the rest: Indeed, he says, it is the most thrifty orchard to be seen in the part of the country where he resides.

The holes for the trees were dug about four feet wide, and two spits of the spade in depth; the trees were then set in, without any manure under the roots; the earth dug out of the holes was alone made use of to fill them up again; and then he laid over this, and round the trees, a compost made of river-mud, wood-ashes, and a small portion of lime, at the rate of about a common wagon-load for every ten trees.

The three years following, after planting, he cultivated the ground with Indian Corn.

Mr. *Peters* makes mention of young appletrees taken from a clay soil, and transplanted in one more suitable; and that they became more thrifty than other appletrees, planted at the same time, and in the same ground, but which had been taken from a nursery where the soil was suitable for the growth of this tree.

He also planted some appletrees at the depth of two and a half feet; but they did not become thrifty, until roots had started out nearer the surface.

In order to prevent late frost from destroying the fruit, when appletrees are in blossom, or perhaps even after the young apple has formed; let some gypsum be strewed round under the trees, pretty early in the Spring. Common salt, it is said, will answer the same purpose.

A rope of straw, with one end tied round the body of the tree, and the other end immersed in a tub of water placed underneath, will have a similar effect.

The effect of gypsum, in particular, when applied for this purpose, is, that it attracts the moisture in the air, from the blossoms to the earth; as it is well known that lands, when lately manured with gypsum, have much heavier dews on them than any others. Salt is said to have much the same effect, in attracting moisture.

It seems to be well ascertained, that raising red-clover in apple-orchards, for the purpose of mowing particularly, proves injurious to the trees, and more so to the fruit, by causing it to fall off permaturely; but that, if gypsum be applied to the growing clover, it will prove less injurious to the trees and fruit; and that, if this manure be applied, and the clover fed off, neither the trees nor the fruit will be essentially injured.

Mr. *Philips*, of Pennsylvania, finds Hogs of great use in an orchard of plumbtrees. They cause his trees to bear plentifully; while, without these animals, the trees bear very little. The reason of this is, that the Swine, by eating up all the fruit which falls from the trees, destroy the young brood of *curculiones* deposited in the fruit, which is the cause of its early falling off.

See INSECTS.

Mr. *Garrigus*, of that State, says he has two orchards of the same kinds of fruit; the one more exposed to the east winds than the other; and that he has known that, most exposed, to bear no fruit, during a season when that wind prevailed, while the other bore considerably.

We have seen orchards as productive of fruit as usual, which were never ploughed, but kept constantly for mowing-grounds; but such were on rich soils, though not inclining to clay. The *fiorin-grass* would probably be found much the best, for combining the meadow and the orchard together, as that grass is said to grow as well in the shade as elsewhere, and to grow well in almost all soils.

See GRASSES.

As soon as the young trees begin to bear, care should be taken that they are not overloaded with fruit; for, in such case, perhaps even grafted fruit, when taken from stocks which were yearly bearers, may become alternate. We have heard the contrary of this asserted.

See APPLETREE.

But of its truth we have no experimental knowledge; although we deem it a matter very important to be ascertained. But, until this shall be the case, we should rather advise to ease the young tree of part of its load, if it appear too heavily laden the first and second years, as soon as it can be ascertained what proportion is to remain, after that part which usually dies has fallen off.

This is more particularly to be attended to, in regard to appletrees; as peartrees are but seldom alternate in their bearing.

In regard to pruning, we shall merely observe, that it may be overdone. A profuse loping away large limbs is seldom necessary.

It is more essential, that young trees be properly trimed at first; and at this time the limbs which stand too thickly, or cross each other, or extend in wrong directions, together with those which are dead, or unthrifty, may be readily taken away; and the wounds thus made, being small, will soon close over.

But, where large limbs are cut away, the wounds will produce a rot in the tree, unless the wood be carefully shielded from the weather, by Mr. *Forsyth*'s composition, or something similar.

OVERFLOWING OF THE GALL. *See* NEAT-CATTLE.

P.

PAINTING OF BUILDINGS, &c. For painting the roofs of buildings, Mr. *Patterson*, of Newjersey, has, some years since, given the following directions, which have been highly approved, as the best composition known for preserving the roofs of houses; as it is found, that it hardens by time, and is an effectual preventive against the roof taking fire, from the sparks of the chimney.

'Take three parts of air-slacked lime, two of wood-ashes, and one of fine sand; sift these through a fine sieve, and add as much linseed oil as will bring it to a consistence for working with a Painter's brush. Great care must be taken to mix it perfectly.'

We believe grinding it as a paint would be an improvement. Two coats are necessary; the first rather thin; the second as thick as can be conveniently worked.

Painting of wooden buildings, of every kind, is not only ornamental, but the Owner is well repaid for this extra expense, by the greater durability which the paint gives to them. The wooden fences also, which are intended to be ornamental, round, and near buildings, should never be destitute of a good coat of paint.

PARSNIP (*Pastinaca*) The cultivation proper for parsnips, is very similar to that of carrots, and the same kind of soil and manures are suitable for each. They, however, require the soil to be very deeply dug: Eighteen inches is not too deep. They are full as good for feeding and fating cattle as carrots, and are about equally productive. They might be cultivated to advantage for feeding in the Spring, when the stock of carrots has become exhausted; as the best way to keep them over Winter is, to let them remain in the ground during that season.

When dug in the Fall, for family-use, the best way to keep them through the Winter is, to bury them in moist sand In Spring, those left in the ground, and wanted for that use, should be taken up before they begin to sprout.

Probably the Farmer would find the culture of parsnips nearly as profitable as that of carrots, particularly for Spring-feeding. They are planted in beds and sown or drilled in rows across the beds, having the rows about ten inches apart. The plants in the rows should, at the last hoeing, be thined to the distance of about four inches. Those which are pulled out in thining will then be good for Swine.

Freezing does not injure this root; and, therefore, those which are kept in Winter, for family-use, had better be kept in rather a frozen state than otherwise; because, if kept too warm, they will sprout, and this spoils them for eating.

PASTURE. The subdivisions of land, that is kept for the sole purpose of pasturing, should depend as well upon its fertility, as upon the number of different kinds of cattle that are to be fed on it. Fifty acres of land, that would only feed three Cows during the season, would not pay the expense of subdividing. On the contrary, if the Farmer has but three Cows, and has three acres of the best pasture-land, he ought to divide this into at least two parts; so that the one can be growing while the other is feeding.

Again, if he keep twenty Cows, and has twenty acres of the best pasture, he will find his account in having it divided into four parts, and pasturing each enclosure three or four days, alternately. In this way, pasture-lands will keep at least one-fourth more of cattle, and will keep them much better, than if the whole pasture were in one field.

Not only a change of pasture is beneficial, but a change of different kinds of cattle in the same pastures should be attended to. Thus, let the Milch-cows take the first cropping of each field, in rotation; then the Horses and Oxen, and the Sheep next: In this way, the last feeder will eat much grass that has been rejected by the former.

Wet miry spots in pastures should be drained off, either by open or hollow drains; for, by this mean, the grass in such spots will be doubled in quantity, and much improved in quality. Bushes should be cut out and destroyed; thistles and other noxious weeds should be mowed down before they go to seed, and every mean taken to eradicate them.

It is never advisable to pasture lands too closely, particularly in the Fall, as this only tends to diminish the quantity the next year. In this respect, it is the same with pastures as with meadows; the closer they are croped the less will be the next year's supply.

Where the pasture has yielded much feed, there will, of course, be much dung droped: To beat it to pieces, and scatter it over the field, will tend constantly to recruit it.

Sheep require no water in their pastures; it is also the better opinion, that Calves should have none; and, generally speaking, that Horses should have little or none, except when they are worked. The effect of this treatment is, that they become habituated to lie by in the heat of the day, and feed at night, when the dew is on the grass, which renders it more nourishing.

Cows, however, ought to have water; and, where their pastures afford none, the better way is to sink a well at that spot where the pasture-lots corner together; and then with a little machinery, which will be but a trifle of expense, sufficient of water may usually be raised every day by the winds, for the purpose of filling the troughs as often as they are emptied. The methods of doing this are so simple and easy, that they are hardly necessary to be described.

See further, WIND-MACHINERY.

In place of wells, however, artificial ponds are recommended by some.

See PONDS.

In pastures which are on the sides of hills, water may be easily obtained in another way; that is, by diging horizontally into the hill till you come to it, and then carrying it out in a pipe, or conductor, made for the purpose. Another method is, to dig a well on a steep part of the hill, and place a syphon in it, with so small a pipe that it will not let off the water fast enough to exhaust it in the well.

Another method of making a well, as recommended by *M. Cadit de Vaux*, is to bore a hole into the earth, with an augur or borer made for the purpose, until sufficient of good water is found. If that which is first found is not good, bore deeper, until you come to better; and bore sufficiently deep to afford a full supply.

Let the hole be about eight or nine inches in diameter. As the augur gets filled with earth it is taken up, emptied, and let down again. After the hole is made, a wooden tube is inserted in it, and the water is raised by pumping.

This is a very cheap and safe method of making wells, and might be advantageously performed where the earth is free of stones and rocks.

Lastly, as a matter of ornament and profit, let your pasture-lands be planted with some useful trees; and probably, for this purpose, the locust will be found the best.

See LOCUST.

The sugar-maple may also be found very advantageous, where the soil is suitable to it, and where a yearly supply of maple-sugar is desired, which will be found an article of no small profit.

See MAPLE.

For the best grasses, for pastures, *see* GRASSES.

PASTURE OF PLANTS. Every plant requires a given quantity of earth to nourish it, into which its roots extend for that purpose; and the quantity thus required is called the requisite *pasture* of the plant. Some require more earth, and some less. Some require a greater superficial extent with less depth; while others require a greater depth with less superficial extent.

For instance, a plant of Indian corn requires a superficial extent of, say, three feet in circumference, and a depth of six inches; while a root of the beet, carrot, or parsnip kind, requires a superficial extent of, perhaps, only twelve inches in circumference, but a depth of, say, fifteen inches. A plant of flax, on the contrary, will not require more than six inches in circumference, and five inches in depth.

It will probably be found, that the greater depth is given to all plants, the less circumference they will require; that the roots will, in that case, shoot further downwards; and, therefore, the deeper you plough, the thicker you may sow.

This is a matter of nice calculation, and well worth the attention of the ingenious Farmer.

In order to illucidate this, the proper method is, to try various plants in beds of the same soil, culture, and dimensions, but dug of different depths, and the plants set at different distances, and then the results will lead to the truth.

Thus, for instance, make four beds of carrots, which shall be dug equally well eight inches deep; let the roots in the first bed stand at the distance of four inches from each other; those of the second, at the distance of six; those of the third, at the distance of eight; and those of the fourth, at the distance of twelve inches; and then let it be ascertained which bed has the greatest weight of carrots.

In the mean time, have four other beds dug twelve inches deep; and four more dug eighteen inches deep; and plant one of each of them at the respective distances above mentioned, and ascertain what is the result of each. The same experiments can be tried with equal exactness on most other plants, and the results equally well ascertained.

PEA *(Pysum.)* There are a variety of peas; some of which are more, and others less, valuable for cultivation. The best for garden-culture are the small early, and the marrowfat pea; the former for early use, and the latter for an after and more abundant supply.

The method of cultivating each, in the garden-way, is too generally known to need any particular description. They may be sown in the field, in the broadcast-way, for family-use, which is much the easiest, as the trouble of raising them in the garden is very considerable.

The culture of the common field-pea is considerably attended to in this State, among the German Farmers, and usually precedes the crop of wheat; being considered a good preparative for that crop, as the ground is left mellow, and but little exhausted by the crop of peas.

They yield from sixteen to forty bushels an acre. The haulm is also of some considerable value for fodder. The allowance of seed is two bushels to the acre; though, perhaps, a greater allowance is advisable, as the thicker they are sown the less liable they are to fall flat to the ground, which in some measure prevents the filling of the pods.

They are to be sown during the first decrease of the moon, after the ground can be prepared in the Spring; for, if not sown while this planet is performing that part of its revolution, the crop will ripen unevenly; some stalks will be green, while others are dead ripe. The ground should be well mellowed, before sowing. Gypsum is excelent for this crop, where the ground is suitable for that manure.

Soaking the seed in some fertilizing liquor, before sowing, such as a solution of saltpetre, old urine, kept for the purpose, lie of wood-ashes, or perhaps all united, would, no doubt, be of service to the crop. If the soil be inclining to clay, let the seed be dried with lime; but with gypsum, if it be suitable to the ground.

The crop, to make it sufficiently profitable, should be of luxuriant growth; and as such will cover the ground more completely, it will, on that account, be in better condition for the succeeding crop of wheat.

In regard to harvesting, the practice we have seen is, to let the crop stand till it is dead ripe. If it were harvested while the haulm was partly green, it would be much better for fodder; and we believe the grain would not be thereby essentially injured; though, perhaps, a little more trouble would be requisite in drying the haulm.

It is cut by the German Farmers with a sithe-and-cradle; but we believe a common mowing-sithe is just as good for the purpose. In cuting, it is at the same time gathered into small bunches; in which situation it lies till sufficiently dried, and is then carted in.

The threshing is not difficult. It is done with the flail, with Horses, or with the roller described under THRESHING. The machines for threshing, commonly in use, it is believed, would not so well answer for this crop.

Peas are subject to the depredations of a small black bug, that eats into them. It does not, however, hinder them from growing; but, if not destroyed, the next crop will be infested with these insects.

To kill them, let the peas designed for seed be put, a few seconds, into some, or a mixture, of the liquors before mentioned, made hot; and then dried in the manner before directed, and sowed immediately.

Those designed for cooking may also be cleared of these bugs, by the use of hot water; as they will drop out of their holes, after they are dead, and may then be easily sifted out.

Peas are best adapted to smooth lands; as it is somewhat difficult to cut the crop in stoney grounds. With the aid of gypsum, they will grow very well on light sandy lands; and, generally speaking, they will grow to advantage on almost every soil that is sufficiently dry, and rich, for a good crop of wheat. If the ground be too rich, however, they will run too much to haulm, and yield the less.

The crops we have seen raised, which were principally in the lands on the Mohawk river, appeared to be lessened in product, for want of a change of seed.

Whether the marrowfat pea would grow too tall, and be inclined to fall down too soon, to be advantageous for field-culture, is a point on which we have no information. They might probably be found most suitable to poorer soils, where their growth would not be too high; and in such case their product would probably be much greater, than that of the common field-pea.

Would they not be found well adapted for extensive culture in the fine mellow, but much-exhausted, lands which lie contiguous to the Atlantic, in the Middle and Southern States? If the soil there, in its present impoverished state, should prove too weak, it can be easily raised to the requisite degree of fertility, by the application of gypsum. But, indeed, those lands want nothing but a plentiful application of this manure, with the use of red-clover, to fit them for almost every production.

Peas are superior to Indian corn, for fating Swine, or other cattle. For this purpose, they should be steamboiled. *See* STEAMBOILER

They are much used, where raised, for feeding Horses; but, for this purpose, a mixture of oats with them is believed to be preferable.

When hulled, they are excelent for soup, for puding, &c. Some of the common field-peas, however, do not boil soft so readily as others. The marrowfat peas, when dried before they are fully ripe, are best for such purposes, as there is no necessity for hulling them.

Peas exhaust the soil but little, and are considered as good to precede a crop of wheat, as any other crop whatever. If the profits of the crop can never be very great, so neither are the expenses incured in its cultivation.

PEACHTREE (*Amygdalus.*) Peaches are of two kinds; the clearstone and the clingstone; but there are good varieties of each. The same sorts can only be raised by grafting, or inoculation: This may be on apricots, or on plum-trees, and will make the grafted trees longer lived.

The trees should have a warm, dry, fertile soil: A sandy loam is best. If the spot where they are planted be sheltered from the northerly winds, it will be the better.

To raise the young trees, take stones that are fully ripe, and plant them in October. They will come up and grow to a good size in the course of the Summer. They are to be kept clear of weeds, while in the nursery. At a year's growth, they may be grafted, or innoculated, and, after two Summer's growth, they may then be transplanted. This may be done when the leaves have fallen in Autumn, or in the Spring.

Take plants with one strong clean stem, or, if they have two, cut one away, however fair. Let the downward root be cut off, in order that the tree derive its nourishment from earth nigh the surface, which will make the fruit less crude, and finer tasted. Be careful not to plant the trees too deep; for this is injurious to all fruit. Let the pruning of the new-planted trees be omited, till they have taken root.

Mr. *Forsyth* gives some particular directions for training, pruning, &c. the trees, to make them good bearers; all of which may be well enough for the climate of England, but does not seem necessary to be observed here. Where the climate is suitable for peaches, in this Country; that is, where the frost of the Winter does not kill them; they generally bear so much that the trees are frequently broken with the fruit, if part of it be not taken off.

Mr. *Forsyth* also gives a list of the best peaches raised in England, which ripen at the different months of the season for peaches; but, no doubt, this Country is capable of affording varieties equal, and perhaps superior, if sought after.

In making a proper selection of trees, from which to graft, or inoculate, a due regard should be had to three essentials.

1. To obtain the grafts, or buds, from trees bearing the finest fruit.

2. That this fruit should ripen at different times, from the earliest to the latest of the season for peaches.

3. That the grafts, or buds, be taken from trees which are plentiful bearers; but not such as bear so plentifully as to be broken by their fruit.

But, perhaps, the too-plentiful bearing of trees is a quality not properly descendible to thōse which are raised from them, by grafting, or otherwise. It would be well to ascertain this point, by experiment.

It is said, by some, that if the stones of peaches be buried immediately, without drying, they will produce trees bearing the same kinds of peaches, as those whence the stones were taken. This is well worthy of particular trial.

Before closing this article, we shall present to our Readers the method practised by Mr. *Bayley*, of Accomac county, Virginia, for cultivating this tree, as communicated by Mr. *Geddes*.

'Mr. *Bayley* has now (1814) sixty-three thousand trees, and a large distilery which is employed only one month in a year.

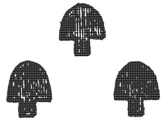
'His peach-orchards are planted in rows from north to south, twenty feet apart, and in each row a tree is placed at every ten feet. He has tried a tree at every twelve feet, and prefers ten feet. The stem, from the ground to the limbs, is only two feet long, the trees being less exposed to injury by the winds; and, in Mr. *Bayley*'s opinion, the branches grow more upright, and he is enabled to plough closer to the trees than if the stems were longer.

'He has tried Mr. *Coulter's* method of having no stems. He puts stones in the ground, any time between November and April, but prefers December; and cuts out dead and broken limbs, without any other pruning.

'Ploughing and harrowing the orchards is commenced when the Spring-frost is over; and about this Mr. *Bayley* is very particular. He ploughed, one year, a part in March; after which came frost, and every peach droped off the trees in the part ploughed; while those ploughed, after the frost, yielded a fine crop. At present, he ploughs in the latter part of April; again in May; harrows in June; and again in July.

'The plough is a very light one, drawn by one Horse or Mule, only scarifying the surface, to keep down the grass and weeds, and not cuting the roots of the peachtrees, which run very shallow.'

'His harrow is nothing but three hoes, nine inches wide, each, placed under' a triangular harrow-frame; 'their situation and shape thus, making together a breadth of twenty-seven inches.'



'Another piece of labor has to be performed in this warm climate, which serves *likewise* to keep down the weeds and grass under the trees. An insect, resembling greatly in appearance the botfly that teases our Horses, pierces the bark of the trees, a little below the surface of the earth, and there deposits, in June and July, its eggs; out of which are hatched a red worm, half an inch long, and of the thickness of a coarse knittingneedle. These worms injure the trees much, and often kill them, by girdling them quite round, just under the surface of the soil.

'To prevent these winged insects from operating on the softened bark, near the surface, a hill of earth about a foot high is raised round each tree, about the 1st of June; and taken away about the 1st of September. These insects either find the bark too hard and dry to pierce, or the taking away the earth leaves the eggs uncovered and they purish. The fact is, after ten years trial, Mr. *Bayley* has found his trees thus completely preserved against the worms.

'The age of a peach-orchard, Mr. *Bayley* estimates at twenty years. He has seen them much older; but thinks more profit is to be had, by replanting at the end of twenty years. A tree is nearly in perfection the sixth year; when it will yield annually at the rate of fifteen gallons of fourth-proof brandy, for every hundred trees. The price of this liquor, before the War, was one dollar fifty cents, and now two dollars per gallon.'

'When the season of gathering peaches commences, a number of Hands are hired, chiefly Boys, at the price of one-third of a dollar per day. The Hands gather peaches at the rate of one hundred gallons of peach-juice per day, each, which yields seven gallons of fourth-proof brandy.

'A Man and a Horse bruises, and puts into tubs for fermentation, enough per day for one thousand gallons of juice. The peaches are bruised in a mill, similar to the stone bark-mills; but the wheel is a wooden one, four feet in diameter, and nine inches thick, runing in a circular trough eighteen inches wide, and twelve inches deep. The peachstones are not broken, nor any use made of the kernal.

'After complete fermentation, which often takes eight days, the juice is drawn through a tap near the bottom, and distiled as cider is. When no more juice will run, the pomace is pressed to get out what remains.'

Mr. *Geddes* observes that, notwithstanding the expense of the ploughings and harrowings, &c. the clear profits of the orchards of Mr. *Bayley* have frequently been upwards of twenty dollars an acre.

It might be further observed, that the pomace, after the juice is expressed, together with the stones, might be made of considerable value, in feeding and fating Swine.

This culture seems more particularly adapted to the great tract of mellow, level, sandy land which stretches along the Atlantic, in the Middle and Southern States, than for harder soils, and hilly grounds; as the hardness of the soil would increase the expense of tillage, and the soil of hills would be subject to waste, by the heavy rains, when kept constantly under the plough.

We would merely observe, that planting a row of pumpkins between each two rows of trees, would probably afford a great additional profit; as they could be cultivated with merely the additional expense of hoeing the plants, and applying a little gypsum, or other suitable manure, to the hills.

The rows of these, being each ten feet distant from the rows of trees, would be but little injured by their shade. Let the pumpkins be planted in hills, at the distance of about four or five feet from each other.

See PUMPKIN. *See* also, FRUIT-TREES, NURSERY, TRANSPLANTING, &c.

PEARTREE *(Pyrus.)* This tree will grow better on a stiff clay, than most other fruit-trees; but the soils which best suit the appletree are also most suitable for it. A scion of this tree may be grafted on an appletree; but it does not answer so well, as when grafted on a quince, for dwarf-fruit; and a quince answers well to be grafted on a peartree. The pear will also grow on the white-thorn. The best way, however, is to graft the pear on its own natural stock, selecting scions from the best trees, as in the case of appletrees.

Let some part of the selection also, as in the case of peachtrees, last mentioned, be made from trees whose fruit ripens at different times, in order to have a full supply for family-use. Generally, it may be observed, that the culture which is proper for an appletree, is also proper for a peartree.

See Appletrees, Orchard, Fruit-trees, Nursery, Transplanting, &c.

PERRY. To make good perry, manage the pears in the same manner that apples are directed to be managed to make good cider, with this difference, that the pears need not be sweated so long as the apples, by being laid in heaps for that purpose.

See Cider.

A drink, called *perkin*, is also made from the pressed cheese of pears, in the same manner that *ciderkin* is made from that of Apples.

More attention should be paid in this Country to the selection of such peartrees as bear plentifully, and yearly, of the best kinds of fruit.

See Cutings, Orchard, &c.

PLANETREE, or BUTTONWOOD (*Platanus Occidentalis.*) This tree is a native of this Country. It grows rapidly, and is useful in pastures for shade, and ornamental in many situations. It is good for fuel; but very difficult to split, owing to the crookedness and intermixture of the fibres of the wood.

This circumstance would, however, seem to render it particularly valuable to cultivate, for being sawed into boards for cabinet-work; for these, when polished, and colored in the manner we shall mention, are said to be as beautifully clouded, as the clouded mahogany.

The color of mahogany is given to this wood, by staining it with a mixture of Dragonsblood, from the Canaries (not that from Madagascar) and oil of turpentine, boiled in a stone or porcelain vessel, and laid on boiling hot. If the boards can be boiled in this mixture, it will stain them nearly through.

If the wood of this tree be free from any disposition to warp or twist, when sawed into boards, it may be found valuable for being made into furniture, when the method of giving it the mahogany-color is known.

PLOUGH. To construct this implement in such manner that it will do its work effectually, and at the same time pass through the ground with the greatest possible ease, is a matter of the utmost importance; as well to the Farmer individually, as to the Country at large, in an economical point of view.

It is found, in Greatbritain, that two Horses can as easily draw one of the ploughs, which are constructed after the most modern improvements, as three can one of those which were formerly used there; of course, the Farmer becomes thus enabled to perform his ploughing with one Horse less, to each plough, than formerly; which may be estimated at a saving of about forty dollars a year, for the labor of each Horse thus dispensed with; or a saving of labor to the yearly value of some millions of dollars to the Country.

It is the various means which have been adopted for saving of labor, in that Country, which have principally contributed to raise it to that degree of power and eminence, which at present it possesses.

It is not to be expected, that every common Mechanic can construct a good plough. The making of them ought to be a separate business, and conducted by Men of sufficient genius, and information, for the purpose. A patent-plough is now made and sold in the county of Cayuga, which is said to be very well constructed.

If ingenious Mechanics would make themselves acquainted with the principles necessary to be observed in the best construction of ploughs, and would keep such constantly for sale, they would find the business profitable, and they would be rendering essential service to the Country.

In the American Edition of the Edinburg Encyclopedia are exhibited, drawings of well-constructed ploughs; and the principles necessary to be observed in their construction are there also laid down. The Farmer, or the Mechanic, may readily refer to the Work in question.

As it is very difficult to convey an adequate idea of a well-constructed plough, without drawings of it, and as this Work is not intended to contain any of these, any description, in detail, of such plough is here omited: Some general observations on the best construction may, however, not be amiss.

1. The lighter the plough, the easier it is drawn. In light smooth soils, which offer no impediment to the plough, it may be very light, and yet sufficiently strong. In those which are stiff, stony, or rocky, its strength must be equal to sustaining the draft, and the shocks it has to encounter. In the latter cases, it requires double, and per-

haps three times, the strength that is necessary in the former.

2. In cleaving the earth, the plough is governed by the principle of the wedge: Like the wedge, therefore, the share and the mouldboard should widen uniformly, and very gradually. The bottom of the plough should be of pretty good length, and somewhat narrower than the usual width of the sward which it turns over at one furrow. Thus, if it usually cut ten inches in width of the sward, the widest part of the share, and of the bottom of the plough, behind, should not be quite nine inches. But the upper side of the mouldboard, behind, should project over beyond this width as much as four inches, in order to lay the sward completely over.

3. The coulter should be set with its lower end in a very slanting direction forward, so as to run under the sward and raise it some in cuting it. The share should be so shaped as to assist in raising the sward, gradually, till it is received by the mouldboard; which, by its twisting shape, should as gradually turn it over.

4. In order for the plough to run steadily, it should have a good length of beam, and it should not be set too high. If the beam be short, and set high, the plough will raise up behind. The beam should, however, be so curved as to rise considerably where the coulter passes through it, in order that the plough shall be less liable to clog, when used in weedy, or stubble, ground.

5. But, after giving the plough the best possible shape, a very essential point is, to have every part that is worn by the earth, in turning the furrow, either plated with, or made of, cast iron, or well hardened steel. If the share is made of the former, the chip may be cast with it, so as to form but one piece; or, if the chip be of wood, it should be covered with plates of cast iron, where it rubs against the earth. The mouldboard should also be cast; and it should be smooth, so that the earth will not adhere to it, as it does to a wooden mouldboard, when ploughing in ground which is somewhat wet. A plough, thus made, passes as much easier through the ground, than one whose mouldboard and chip are merely of wood; as a sled, shod with cast iron, draws easier over the bare earth, than one that is shod with wood.

Cast-iron ploughshares answer very well in smooth lands, and are much cheaper than those made of wrought iron. They, however, require an edge, made of hardened steel, which is fastened to the share in such manner as to be readily taken off, at pleasure.

The German Farmers of this county, and its vicinity, make use of a large heavy plough, supported by two wheels, and drawn by three Horses, which, in smooth lands, makes very good work; but it is believed that ploughs without wheels, when well constructed, will perform just as well, and at the same time as easily, with two Horses, as the wheel-plough will with three.

For the purpose of gaging the plough, when turning over a smooth sward, one small wheel of cast iron, properly fixed under the end of the beam, would be found to run much easier, and would be much cheaper, than the wheelplough just mentioned. This wheel might be so contrived as to be raised, or lowered, so as to make the plough run deeper, or shallower, at pleasure.

Instead of the present method of directing the plough, it might be performed, to better effect, in smooth lands particularly, by a moveable coulter, which could be turned to the one side or the other, by a tiller; so that the operation of steering the plough would be similar to turning the rudder of a vessel, for the purpose of steering it, if the rudder were placed before.

In the one-horse plough, which is proper to be used in cultivating hoed crops, a coulter is not necessary. The share, and the construction of the plough, in other respects, should be nearly similar to that of the plough, first spoken of, but smaller, and lighter; and it is not so essential to have its mouldboard of cast iron; nor need it have so much of the twisting shape.

In constructing a plough to be drawn by two or more Oxen, it is believed that the better way is, to extend the beam quite into the ring of the yoke; and, even, in such case, the beam need not be very long, as the heels of the Oxen would require to be only a little before the coulter. A plough thus contrived would be found to run as steady as a wheelplough.

Nor would there be any difficulty in extending the beam of the plough between a span of Horses, and thus bringing them back, in the same manner, so that their heels should be just before the coulter. In this case, there should be a cross-piece, fixed on the end of the beam, about eight inches in length, and from the ends of this two short ropes, or chains, should extend to the inner sides of the haims by which the Horses are to draw; and two such short ropes, or chains, should extend from the outer sides of the haims to two outside shafts, which should extend from a cross-piece, to be set on the beam of the plough, just before the coulter.

A two-horse plough, fixed in this manner, would also run as steadily as a wheel-plough; the team would be much shortened, which in ploughing is highly desirable; and the expense of the harness for the Horses need be nothing more than that of the short ropes or chains, before mentioned, which are to be attached to a pair of wooden haims to each Horse; each haim being nothing more than two pieces of wood, about three inches broad, properly shaped and smoothly rounded on the sides, which are put, one on each side, of the shoulder of the Horse, and tied together, above and below.

It has been well ascertained, that haims of this kind are less liable to injure Horses, than any kind of harness whatever.

A onehorse plough may also be drawn, by having the Horse between shafts fixed to the beam of the plough. In this case, and also where the plough is drawn by two Horses, in the manner just described, the cross-pieces which hold the shafts should each work on a pivot, so that the plough could be inclined to the one side or the other, for the purpose of directing it; unless the method, before described, of directing it by the coulter, should be adopted.

A 'double-fined' plough is described by Mr. *Livingston*, which he saw in different parts of France: It 'has a mouldboard fixed on a hook at the share, and by a pin at the broad end, which passes through the mouldboard and into the beam. When it comes to the end of the furrow, instead of making a land, the mouldboard is shifted to the other side; which is done very quickly, and has the advantage of throwing the furrows all one way.'

A plough of this kind is particularly useful in ploughing sides of hills.

Another kind of plough, which is well adapted to that use, is the double-plough; that is, a plough with two shares, coulters, &c. placed on the opposite sides of the beam; so that when a furrow is turning with one share, the other is above the beam bottom upwards. At the end of the furrow, this share is turned down, and the other up, and thus the work proceeds. The handle is separate; and the lower end is merely set in between pins that hold the beam and the mouldboards together. When the other side of the plough is turned up, the handle is taken out, and set into the other side, in the same manner.

There is another kind of double-plough, which has been long used in some parts of England; and in smooth, light, sandy soils, particularly, is well adapted for dispatch. It turns two furrows at once; and for this purpose has two shares, mouldboards, &c. the one behind the other. It would seem that the principal difficulty, with such a plough, must be in directing it: But, probably, one of the moveable coulters, before described, applied to the foremost share, would obviate every inconvenience.

Ploughs are sometimes constructed with two handles, and sometimes with but one. One is sufficient; two is only productive or more expense. The handle should lean considerably back; and it should have a pin set in behind, near the upper end, to take hold of, and for the lines to rest on, where Horses are used in ploughing.

A small handplough might, as is believed, be very advantageously used for the purpose of eradicating weeds among several kinds of growing crops of roots; such as onions, carrots, parsnips, &c. It should have two light handles, leaning well backward, of the length of, say, four and a half feet, or of such length as will be found most proper for the purpose of *pushing* the plough forward by hand.

It should have a beam, and share, of such dimensions that the plough would cut a furrow of, say, an inch in depth, and about four inches wide. The share should be shaped similar to that of the large plough, before mentioned; and it should be kept well ground, so as to cut off all the roots of weeds which come in its way.

For the purpose of regulating the depth that it should run, it may have a wheel, or roller, placed under the fore-end of the beam; though it is believed that, in skilful hands, this would not be necessary. It should be run close to the rows of roots, turning the furrow from them, in the first place, and then turning it back to them again.

PLOUGHING. Mr. *Livingston* mentions an experiment made, by which it was ascertained, that dew, when evaporated, is found to contain a rich sediment, that rainwater does not possess; and hence may be adduced a good reason for the commonly-received opinion, that ground is most benefited by ploughing while the dew is on.

In preparing for a crop, some lands require to be oftener, and some to be deeper, ploughed, than others. The stiff and clay soils require the most ploughing, and the gravelly soil the deepest. The more dry and gravelly the soil, the deeper it should be ploughed, in order to enable it to withstand the droughts of Summer; and the more stiff and clayey the soil, the oftener it should be ploughed, and also rolled, and harrowed, in order to reduce it to a fine tilth, and to raise in it that state of fermentation, each of which, in such soils, is essentially necessary for the growing of crops.

It may indeed be laid down, as a general rule, that every kind of soil should be in a finely-pulverized state, before it is applied to the growing of crops; but some soils are much easier reduced to this state, than others. The light sandy soil is easily mellowed: It neither requires much ploughing, nor need the ploughing be very deep; but this soil essentially requires, that what is not expended on it in ploughing, for the growing crop, should be laid out in manuring it.

See IMPROVEMENT OF LANDS.

Mr. *Young*, in his Six Weeks Tour, found that the average depth of ploughing sandy lands, in Greatbritain, was four inches; of loamy soils, four and three-quarters; and of clayey soils, three and a half. In Ireland, they plough considerably deeper than this.

See PASTURE OF PLANTS, for the method of ascertaining what depth in ploughing will afford the greatest crops of the different kinds of plants.

But it should be remembered, that the deeper you plough, the more expensive is the operation; and this additional expense should be taken into the estimate, in determining what depth it is most profitable to plough. Generally speaking, it is believed that, for most kinds of crops, the depths just mentioned will be found to answer as well as any other; except, that very dry gravelly soils should be ploughed considerably deeper.

The practice of Mr. *Young* was, not to plough very deeply in common; but to give his lands deep ploughings at certain intervals. This may be very proper where the soil is naturally deep; where the upper stratum of vegetable mould has been artificially made deep by a long course of tillage, and manuring; or where this stratum has become exhausted by severe croping, and that below is a strong earth, which can be readily fertilized by the Winter-frost, and Summer-sun.

But, where the earth below is naturally poor, and incapable of being quickly fertilized in this way, no benefit can result; but, perhaps, much injury, from ploughing deeper than usual.

For turning up a new layer of earth, *see* TRENCH-PLOUGHING.

Mr. *Deane* makes mention of a piece of land which was Summer-fallowed, and sown with rye. One part was ploughed three times only; the other part, eleven times: The crop was all harrowed in at the same time; and the result was, that the product of the part which was most ploughed was about double that of the other.

It would have been well to have mentioned, what kind of soil this was; as this would have served to assist in pointing out the soils which are most benefited by frequent ploughings. Generally speaking, it is believed that all the more obdurate kinds of soils are most assisted by frequent ploughings, and harrowings, and some of these, perhaps, more than others.

See FALLOWING OF LAND.

Ploughing should always be done effectually. Of whatever depth the soil is to be ploughed, every part should be turned up, or loosened, to that depth. The furrows, therefore, should not be too wide; for, if they are, parts of the ground will remain unturned, or unloosened. In order that the ploughing be completely performed, the plough should run perfectly flat, and be of the best construction.

See PLOUGH

Among most Farmers, it is the practice constantly to turn the furrows against the fences; but this is slovenly culture, and is injurious to the land. The uppermost part of almost every soil is the richest. Now, if you keep constantly ploughing the land next to the fence with a cleaving-furrow, this upper layer of the soil becomes, at length, all thrown up against the fence, on the one side of the land, and into an useless heap on the other; and, to supply the place of the soil thus thrown off on each side, the crude earth below must be thrown up; and this earth will require considerable time, tillage, and manuring, to make it as good as the soil which has thus been improvidently turned off from the surface of the field.

This matter is the more worthy of attention, as it requires no trouble whatever to correct this slovenly practice: All that is necessary is, to plough the lands next to the fences as often with a gathering, as with a cleaving, furrow; or, in other words, to plough as often from the fence, as against it. Indeed, it would be desirable, in every part of the field, to have the gathering-furrows always at the places where the last parting-furrows were made. This would serve to keep the layer of vegetable mould spread evenly over the surface, which is a matter of more consequence to the growing crop, than is generally imagined.

In the ploughed field, the gathering-furrows of repeated ploughings will frequently happen to be nearly in the same places; of course, the parting-furrows will be nearly together in other parts. By these means, the vegetable mould becomes unevenly spread over the furface; in some places it is deeper than is necessary, and in others too scanty; and this is usually productive of a proportionate deficiency in the growing crop, where the mould is too thin, without a coresponding increase, where the mould is deeper than is necessary.

Now, all that is requisite, in order to remedy this inconvenience, is to have the field marked out into lands, and then to plough these with cleaving, and gathering, furrows, alternately; and, to mark out the lands, it is only necessary to measure their widths on the four sides of the field, and then to designate the extent of each land by visible marks, fastened on the fences on the different sides of the field.

Sometimes, however, fields are too irregularly shaped, or of too uneven surface, to be convenient for ploughing in this regular manner.

Sides of hills, which are steep, can only be ploughed to advantage by constantly turning the furrows downward.

See PLOUGH for the kind of this implement which is proper to be used for this purpose.

But lands of this description are unfit for the plough; or, if ploughed, it should be but seldom. Rather let them be kept for pastures, for orchards, for raising growths of wood, or, in some cases, for vineyards. By ploughing such lands, the upper stratum, or vegetable mould, is constantly descending to the bottom of the hill; not only by its being thrown farther down at every ploughing, but much of its finest parts are carried down by the heavy rains.

Some sides of hills are, however, of such soil as is little washed by the rains; and are at the same time of such a depth of that kind of earth, which can be readily converted into a good vegetable mould, that they may be ploughed for centuries without essential injury; provided they are as well treated as other lands, in regard to manures, and frequent crops of grass.

Where the sward is turned over, in order to be harrowed in with a crop, it should be done in a very careful manner: The sward should all be completely turned over; but, say some British Writers, not so as to lie flat; the sward last turned should lap a little on the one next preceding, in order that, by this mean, the harrow may the more readily take hold of the soil.

This method of raising crops, however, will only be found successful in the sandy and mellower kinds of soils; In the very hard, or stiff, kinds it will seldom do well; but in all soils a clover-sward, turned under, will be found to answer the best purpose.

Under FALLOWING OF LAND, considerable has been said, in regard to ploughing, which need not be here repeated. In general, it may be observed, that, after the sward has been turned over, the object of further ploughings being to mellow the soil, and thereby to produce that degree of fermentation which is essential to growing of plants in the best manner, and of keeping up that fermentation as long as possible; much depends upon the *time*, as well as the *manner*, in which the ploughings are performed.

If the ploughings are but partially performed; that is, if parts of the ground be left unloosened to the requisite depth, the fermentation of the loosened part of the surface must, of course, be partial, and the parts which remain unloosened must present barriers, beyond which the roots of the growing plants cannot extend; of course, the plants must be curtailed of their requisite pasture, and be proportionately lessened in their growth.

One good even ploughing, therefore, where the ground is all loosened to the requisite depth, may prove as beneficial to the growing crop, as two ploughings which are but partially performed; that is, where the plough runs so wide, or so far from a horizontal position, as to leave considerable ridges underneath which remain unloosened by the plough.

Much also depends on the time of ploughing most kinds of soils, after the turning of the sward, except the light sandy, or the very coarse gravelly soil. These may be ploughed soon after the rains; but if the soil be moist, or stiff, or even if it be dry, but contains a sufficient proportion of vegetable mould, the time selected for ploughing should be when these soils will pulverize the most readily.

Under Fallowing of Land, we have mentioned the most favorable time for mellowing clays, when baked into clods.

Soils which do not bake, and yet are sufficiently retentive of moisture, will be most easily pulverized when they are considerably well dried, or at least so dry as that they will not adhere to the mouldboard in ploughing. When in an extreme dry state, they will not, generally, be mellowed so much by a ploughing: Of course, they will ferment less when moistened again by the rains. Still, however, the drier the state of the soil, the better condition it will be in for the purpose of destroying any roots of weeds it may contain, or any grass which may remain unsubdued.

The breaking up of sward-lands being the most laborious operation of ploughing, it becomes necessary to perform it when it can be done with most ease; and this is when the ground is sufficiently moist. Many soils may, however, be too wet, at times, to be broken up to advantage; for, as in that case, much earth will adhere to the mouldboard, the plough will be cloged in its operation, and will not pass so easily through the ground, as when it is somewhat drier.

Sward which is turned over, when quite dry, will rot the soonest, and the soil will be most easily pulverized by successive ploughings; but the labor then becomes much severer, and the plough will not so readily keep its place in the soil.

These remarks are, however, not applicable to the light sandy, or the dry gravelly, soil, before mentioned. These should be broken up, while they have as much moisture in them as they can contain.

PLUMTREE (*Prunus.*) Mr. *Forsyth* recommends the following selection of plumtrees for a small garden:

The *white primordian*, small, yellow, mealy; ripens latter end of July.

Early damask, middle-sized, flesh good; ripens early in August.

Red Orleans, large, rich juice; ripens latter end of August.

Green-gage, several varieties, fine-tasted, distinguished by its size and color; ripens in August and September.

La royal, equal to the green-gage, but a shy bearer; red color; ripens late in September.

Drap d'or, a good plum, and plentiful bearer; ripens late in September.

Saint Catharine, one of the best; rich juice, and good bearer; fruit hangs very long on the tree.

Imperatrice, has an agreeable flavor; ripens middle of October; should not be gathered till it begins to shrivel, when it tastes like a sweetmeat.

The management proper for raising this tree is the same as that for peaches.

See PEACHTREE.

Mr. *Forsyth* particularly directs the tap-roots and the fine hairy roots to be taken off, before transplanting; and that the latteral roots should be spread near the surface, in order to make the fruit fine-flavored. He directs that the ground should be deeply dug, before planting. Where the trees bear too heavily, part of the fruit should be taken off, before it is half grown.

A good sandy loam, well manured, is the best for this tree. Stiff clays are very unfit for it. Mr. *Livingston* mentions a *drap d'or* which stood fifteen years in a stiff clay, and had not grown to the height of nine feet; when, on removing it into his garden, which is a loam on sand, well manured every year, it grew more in two seasons than in the preceding fifteen years.

See FRUIT-TREES, NURSERY, TRANSPLANTING, &c.

POLLEVIL. An imposthume on the poll of a Horse. At first, says Mr. *Gibson*, it requires no other method of cure than is proper for boils and inflamed tumors; but it sometimes, from neglect, or mismanagement, becomes a sinuous ulcer. He says the matter is apt to lodge in a small sinus which is under the poll-bone, unless care be taken to keep the part firm with a bandage; that, if the tumor has a large cavity, it should be laid open; and if it acquire an ulcerous disposition, it should be treated as such.

See further, TUMOR and ULCER.

PONDS. Those which have no natural outlet may, nevertheless, in most cases, be drawn off by sinking a well, or hole, through the stratum of clay, or other close earth which holds the water, until a stratum of gravel shall be found, into which the water of the pond may be carried, where it will sink away. The well, or hole, should be filled up with stones, and the waters of the pond directed by ditches into it. Frequently the bottoms of ponds are found to be fine rich earths, and well worthy of cultivation. The draining of such ponds is also highly requisite, for the purpose of avoiding the *miasma* which proceeds from them, and which is so productive of fevers.

Artificial ponds are sometimes made at the corners of two or more pasture-lots, for supplying cattle with water. One, of an hundred and twenty feet circumference, should be about five feet deep in the centre. To make it retentive of water, it must be lined with a thick layer of tough clay and fresh slaked lime, mixed well together, and beat down hard with wooden beetles or sledges; and on the top of this beat in a good layer of coarse gravel. The edges, and for some distance down the sides, of the pond, should then be faced with a solid pavement of stones, so large as not to be moved by the treading of the cattle. Moist places, and those where water can be collected together after rains, are best for ponds of this kind.

POPPY (*Papaver Somniferum.*) There are two species of this plant, the double poppy and the single.

Doctor *Ricketson* says, that either of the species yield the same quantity and quality of opium. He directs the seeds to be planted in beds, about the middle of May, in rich moist ground; the plants to stand a foot apart. They are to be kept clear of weeds with the hoe.

The plants, he says, yield the most juice during their flowering, and immediately before and after. At this time, he directs the stalks to be cut off about an inch below the heads; and, as the juice exudes, to take it off with a penknife. The part cut off will at first yield juice as well as the standing stalk. When this ceases to run, cut it off a little lower, and so on, till all the juice is extracted.

The juice is to be evaporated in the sun, till it is sufficiently dried.

One method mentioned by Mr. *Green*, for obtaining the juice of the poppy, is by making four or five longitudinal incisions, in each of the capsules of the plant, from the stalk upwards, before or at the time they are fully ripe; taking care, however, not to penetrate the cavity of the seedvessels.

Another is, by pounding the dried leaves, stems, and capsules; boiling them, when pulverised, in water, and then cleansing and reducing it by evaporation. It may be readily cleansed by runing it through a small leach, of about four or five inches in depth, of charcoal, pounded or ground fine, underlaid with three or four folds of flannel.

The seeds of the poppy also afford an oil, which is fully equal to the olive-oil, for the purposes for which that is used. The seeds should be fully ripened, before they are used for this purpose, and the oil they afford is then found as wholesome as any other.

The oil of the poppy-seeds is becoming common in Europe, as a substitute for that of the olive.

The poppy is cultivated to some extent in Pennsylvania; and, no doubt, its culture is found to be lucrative.

POTATOE (*Solanum.*) This root is a native of this Country, and was first carried to Europe by Sir *Walter Raleigh*. When boiled, it is a wholesome and nourishing food for Man or beast. Many families in Ireland subsist on potatoes and milk, and often on potatoes only, with a little salt; yet these are as healthy, vigorous, and well-made as any People in Greatbritain.

Potatoes are usually cultivated from the roots; but they may be also raised from the cutings of the top branches, when set in the ground; and these will strike root, even if planted bottom upwards. The sprouts taken from potatoes will also grow. The root itself will not grow, if planted the same season in which it has been raised.

From the seeds of the apples, potatoes may also be raised; and this is the best way for obtaining new varieties of the plant. Gather the apples after the seeds are fully ripe; mash them in water till they are cleared of the pulp; then dry the seeds; and next Spring sow them in a bed, which is to be kept clear of weeds.

In the Fall, small potatoes will be found at the roots of the plants; and the different varieties of these are to be separately planted the next season; when they will produce potatoes of the usual size; and at this time the respective qualities of each variety can be ascertained.

New varieties may also be obtained, in the manner mentioned under CHANGE AND IMPROVEMENT OF SEEDS.

It is advisable frequently to produce new varieties, as some are much more valuable than others.

Potatoes may be raised to advantage in various kinds of soils; provided they are sufficiently rich, or well manured. They will even grow in peaty grounds, where no other plant could be raised to any advantage. Stiff clays, and cold wet soils, are not so well suited for them. Coarse crude manures, such as fresh barn-dung, moss, peat, turf, old woolen rags, &c. are all good for them. Any manure, that serves to keep the ground loose and mellow, seems well adapted for growing this plant.

They may be raised, of good size, by merely laying them on a green sward, and covering them six or eight inches deep with straw. Salt, brine, or seawater, is also good for them, when applied in moderate quantities to the hills, or rows. It is also found that weting them, and then rolling them in gypsum, immediately before planting, greatly assists the growth of the crop.

Sward-grounds are commonly best adapted for their culture. The method commonly pursued in England, for raising the crop, is, we believe, the most expeditious, and, at the same time, as well calculated to ensure good crops, as any other, and is as follows:

Break up the ground in the Fall, if it be a sward, and give it a good harrowing, at a suitable time, the next Spring; then spread, of barn-dung, or other suitable manure, at the rate of about twenty loads to the acre, over the ground; when it will be ready to commence the operation of planting.

In order to this, begin with runing a furrow, of a suitable depth, and into this furrow the dung lying on the surface is drawn, from a distance of about twenty-seven inches along next the furrow, and distributed evenly along its bottom. On this the potatoes, cut in pieces, are laid along, about eight inches apart, and they are covered by the next furrow. Then two more furrows are run, the second of which is to be the bed for the next row, and the dung is again drawn into this, and the seed laid, as before, which are again covered by the next furrow; and so the work proceeds. The rows in this way are in every third furrow, or at the distance of about twenty-seven inches apart.

If the seed-potatoes are not cut in pieces, but planted whole, they should be laid about eighteen inches from each other; and in this case the dung should be collected more together, at the places where the potatoes are to be laid. There is very little gained by cuting the seed in pieces for planting.

When the plants have risen about six inches above ground, it is to have a good harrowing, across the rows; and the hoe is to follow, for the purpose of seting the plants right, where covered, and drawing some earth round them.

In due season, a furrow, with the one-horse plough, is to be run on each side of the rows, with the earth thrown up to the plants, which is to be followed with the hoe, which completes the process for raising the crop. If any weeds should afterwards rise, they should be cut up with the hoe, so that none be allowed to go to seed in the Fall.

As soon as the blossoms appear, they should all be taken off; as this, by experiments which have been accurately made in Massachusetts, is found very considerably to increase the crop.

For gathering the crop, the most expeditious way is, first to run furrows on each side of the rows, and then a pretty deep one through the middle, which turns up most of the roots to the surface, for the purpose of picking up by hand. A fork, with four prongs, is very good for going over the ground, for bringing up those to the surface which remain covered. A fork of this description, with the addition of what may be called a fulcrum, fastened, by pivot, to the back part of the handle, near its lower end, is an excelent implement for raising potatoes, without the aid of the plough.

The fork is run under the potatoes; and then, by raising up the handle, the fulcrum, turning on its pivot, is brought in a perpendicular direction, with its lower end to the ground; when, by pressing down the handle, the fork becomes a lever, and the potatoes, with the earth enclosing them, are raised up; when, by shaking the mass, the earth falls first, and the potatoes remain mostly on the surface. Those remaining covered, are readily disclosed by the prongs of the fork.

We have thought proper to describe, in detail, this method of raising the potatoe-crop, from a conviction of its superiority, as well in saving labor, as in obtaining the greatest product from the ground. The methods commonly pursued, in this Country, are too well known to need any description.

A Planter, of North-carolina, lately sent some Potatoes to the Westindies, for market; a part of which were dried in the sun, in the usual way, and a part were laid away in moist or wet sand, as fast as they were dug; and, when exhibited for sale, he obtained three times the amount, per bushel, for those laid in sand, that he got for the others.

We mention this circumstance, in order to observe that such potatoes, as are designed for the table, should be laid away in wet sand, as fast as they are taken from the earth.

We have had occasion, by way of experiment, to plant rows of hills, alternately, of the very smallest, and of the largest potatoes; each being selected for the purpose, and one potatoe planted whole in each hill. At the same time, a row of hills was planted with two whole potatoes to each hill; and the result of the whole was as follows:

The stalks, in the hills grown from the small potatoes, were not more than half as bulky and high, as the stalks of those grown from the large ones; and the stalks, of those grown from two potatoes to a hill, were of a medium size between the two.

On diging the crop, no essential difference was found in the product, or size, of the potatoes grown from the small, and the large, ones. The product of the row, grown from two to a hill, was also about the same in quantity; but more numerous, and of smaller size.

We will mention the method of raising potatoes, by the poorer Peasantry of Ireland. The potatoes are cut in pieces, and planted on the sward, previously dunged, and marked out for beds about eight feet wide; leaving the width of about fifteen inches between the ground intended for each two beds, for the purpose of diging a trench for affording earth to cover the beds.

The covering should be about three inches deep. The crop, while growing, is kept clear of weeds, by the hoe, and by hand. In this way, good crops are raised.

Our object, in describing this method of raising the crop, is a belief that it is admirably calculated to destroy the growths of weeds, which are often detrimental to the growth of crops.

We believe that even the Canada thistle, or the wild onion, may be destroyed in this way. By having such a covering of earth laid over them, while in a state of vegetation, they become smothered, as it were; they die for want of that portion of air which is essential to their existence.

See further, WEEDS.

We would also mention, that this method of raising potatoes is adapted for any wet soil, as the trenches serve to lay the beds dry; and this mode of culture might often be used, to advantage, for the purpose of introducing good growths of grass into such lands.

We never should advise to feed Milch-cows with potatoes, either boiled or raw; as we have frequently known Cows to be greatly lessened in their quantity of milk, by being fed on this root. For fating of all kinds of cattle, they are very good, when steamboiled.

See STEAMBOILER.

Potatoes, for the table in Spring, should have a scalding, after the frost is over; and then be dried, and laid away in a chest or box, covered, so as to keep them from the air, and kept in a dry place.

We ought, before closing this article, to notice the method, successfully pursued, as appears from the Memoirs of the Philadelphia Agricultural Society, of raising potatoes and Indian corn together, in alternate rows, or drills. The advantages of this mode of culture would seem to be these:

Indian corn, in order to afford the greatest quantity of ears, requires to stand more widely separated, than it is when grown in the usual way; while, at the same time, other plants, of more humble growth, may be raised in the intervals, without essential injury to the growth of the corn.

It would seem, that as much as nearly one-fourth of additional aggregate product may, in this way, be raised from any given quantity of ground.

Before closing this article, some notice should be taken of the sweet-potatoe, which is cultivated in the more southerly States.

It delights in a mellow sandy soil, and the richer the better. The potatoes prepared for seed are previously raised in the following manner:

A piece of ground is properly mellowed with the plough, and is then thrown up in ridges by two furrows backed together, at the distance of about three feet apart. These ridges are then cut crosswise, with a corner of the hoe, at the distance of about fourteen inches. Pieces of the vines of the growing crop of this root are then taken, of about a foot in length, and laid in the places thus cut down, with their lengths across the ridges, and they are then covered sufficiently deep with the hoe.

From these layers, roots and branches will grow; and in the Fall a crop of potatoes will be produced, of about a fourth of the usual size. These are to be dug, and laid away in moist sand, before they have dried; and the next Spring are to be used as seed for the next crop.

The seed-crop, while growing, is to be kept clear of weeds, like other hoed crops.

We will next speak of the crop that is to be raised from the seed-potatoes.

The ground is to be mellowed with the plough and the harrow, in the Spring; and then the seed-potatoes are to be cut in two or three pieces each, and laid along on the surface, at the distance of about ten inches from each other, in strait rows or drills, which may be about three feet apart; and then a furrow is to be thrown over them from each side, which completes the operation of planting.

Whatever manure is to be applied to the crop, is first to be laid along where the drills of potatoes are to be laid. Fresh barn-dung will be found as suitable for this crop, as for the common sort of potatoes. The crop, while growing, is to be kept clear of weeds, with the plough and hoe.

Perhaps, however, it may be found that the method above recommended, for cultivating the common potatoe, will be found equally advantageous and suitable for growing the sweet; though that mode of culture is quite different from that which is commonly pursued.

The gathering and saving of the crop is similar to that of the common sort.

The product of the sweet-potatoe, when grown in the climate of the Carolinas, or farther south, is about the same of that of the common sort, in the same climates; but, as the former contains most saccharine matter, it would seem best adapted for fating cattle, and of course entitled to a preference, in such climates, for that purpose.

Its nutrimental qualities, like those of the other, are greatly increased by steamboiling.

We believe the product of this root might be made much more considerable than it usually is, were the grounds in which it is commonly raised restored to a proper state of fertility, and suitable quantities of manure applied to the crop, while growing.

There are several varieties of this root. Most probably its growth might be increased by the application of gypsum, in a manner similar to that directed for the common sort.

It is said, that the Heligoland bean may be raised in considerable quantities, in the drills of potatoes, without essentially injuring their growth.

POULTRY. Mr. *Wakefield*, a spirited Farmer near Liverpool, say the Compilers of '*The Complete Grazier*,' keeps a large stock of poultry in the same enclosure, with singular success. He has nearly an acre enclosed with a close slab-fence, about seven feet high: The top of the fence is every where sharp-pointed, like pickets, though perhaps this is not necessary. Within this enclosure are put up slight small sheds, well secured from rain, however, for the different kinds of poultry, and it is supplied with a small stream of water. The poultry are regularly fed three times a day with boiled potatoes, which is their only food, except what grass may grow within the enclosure.

The dung of the poultry, which is exceedingly rich, is carefully saved for use; and the turf of the enclosure is occasionally pared off for mixing with composts.

It would seem that, in the vicinity of large towns particularly, this might be made a profitable employment. But it is believed, that the better way would be to keep the different kinds of poultry separate, as they are not apt to agree well together. Something shall now be said of each sort separately.

Of the *Dunghill-fowls*, as they are usually called, there are various breeds, which it is perhaps unnecessary to designate. When well kept, a good Hen will lay from one hundred and fifty to two hundred eggs in a season, which may be at least considered worth a cent each. If her eggs be not taken from her, she will bring forth three broods in a year, if well kept, and each brood may be estimated at, say, eight grown Chickens.

Guinea-fowls, also, lay many eggs in the course of the season; but as they are naturally fond of wandering away, and laying them where they are not easily to be found, it is not probable they could be confined to an enclosure like the one in question. Their flesh is very good.

The young brood of *Turkies* might, probably, be most advantageously brought forth in an enclosure like this, and, after they had acquired sufficient strength, let go abroad to shift for themselves.

The *Black-turkey* is the most hardy. The young of this fowl are tender and apt to die. The Swedish method of making them hardy is, to take them as soon as they are hatched, or as soon thereafter as they are found, and plunge them in cold water, and force each one to swallow a pepper-corn.

After this, they are subject to another fatal malady which must be removed. In order to this, when any of them are found drooping, pull out such feathers of the tail as are filled with blood, and the Chicken will presently recover.

This fowl is profitable to raise in many situations. They are also of great use in destroying insects, particularly grasshopers.

The Turkey derives its name from the country whence it was originally imported. It appears, however, to be the same with that which runs wild in the interior of our Country.

Of *Geese* there are two sorts, the wild and the tame. In general, they breed but once a year, but frequently twice, if well kept. Three Geese should be alloted to one Gander; for, if the number be increased, the eggs will usually be rendered abortive. About twelve or thirteen eggs are enough for a siting. While brooding, the Goose should have corn and water placed by her, and the Gander should at this time have free access to guard her. The nest should be sufficiently high round the sides to prevent the eggs from rolling out, as they are turned by the Goose every day. It is well also to break the egg slightly, near the beak of the young Gosling, when they are about to make their way out.

Geese are particularly profitable for their feathers; and although the plucking of them so often, as is practised by some, appears barbarous; yet it is found that they thrive better by repeated pluckings, than where they are permited to shed their feathers in the natural way, which is at the time of moulting.

In Lincoln county (Greatbritain) where they are raised in the greatest numbers, they are plucked five times a year; the first at Ladyday, for feathers and quills, and four times afterwards, between that and Michaelmas, for feathers only.

Tame-ducks, of which there are varieties, are the same as the wild. They begin to lay early, and afford a considerable number of eggs, which are nearly as good as those of Dunghill-fowls. About twelve is enough for a Duck to sit on. Ducks are greedy feeders; but not nice, as to their food. They are quickly fated on animal food, of which they are fond, and their flesh then tastes like that of the Wild-duck. They are useful in turnipfields, while the young plants are liable to be preyed on by insects.

Poultry is most easily fated when kept in a dark place; and boiled grain is generally best for the purpose of fating.

PUMPKIN. A new, and very large, species of the pumpkin has lately been cultivated in this part of the country, which promises to be very profitable for cultivation, if it can be naturalized to our climate. At present, it requires early planting, in order to ripen it. Upwards of five hundred pounds of this pumpkin may be readily raised from one seed.

Allowing even every square rod of ground planted with it to yield this amount, the product of an acre would be forty tons; a greater and more valuable product, for the purpose of feeding and fating cattle, during the Fall, and begining of Winter, than can be raised, from the same ground, of any kind of cabbage, or root, whatever; at the same time, it can be raised with not more than half the trouble and expense, to the acre, which the raising of cabbages, and roots, require. Time, however, must test the value of this new plant, which, from present appearances, bids fair to be a great acquisition to the Country.

Pumpkins are probably nearly, or quite, as valuable as the same weight of most kinds of roots, for the purpose of feeding Milch-cows, and fating cattle; and as they are easily raised, and still easier gathered, it would seem that raising, even the common kind, might be made profitable.

In raising a crop, the hills should probably stand about seven feet apart; and, though the crop would require as much ploughing as other hoed crops, yet the expense of hoeing would be but trifling.

The crop would not be half so expensive to raise, and gather, as a crop of Indian corn; it would exhaust the soil but little; and it would be a fine preparative for wheat, as the ground could be cleared of the crop sufficiently early for sowing that grain.

It is believed that an acre, properly cultivated, would yield as much as ten tons of even the common kind of pumpkin; and that these would be found worth as much as sixteen cents per hundred, for the purpose of feeding and fating cattle.

If these estimates are correct, it would seem that a crop of pumpkins, even of the kind last mentioned, would be found as profitable, and as suitable to precede a crop of wheat, as the turnip crop is found to be in some parts of Greatbritain.

This would seem to be a matter well worth the attention of the Farmer: If he can realize such profits from those grounds, upon which he usually bestows a kind of Summer-fallowing for wheat, he will derive a handsome profit where at present he has none; and he would probably find his ground in better order in the Fall, for sowing his wheat, than by the slight culture of fallowing, which is usually given to the soil for raising that crop.

In this case, however, the ground should be broke up in the latter end of the Fall preceding, and cross-ploughed just before planting the crop; which should be planted early, in order to be sooner out of the way for sowing the wheat in the Fall.

The pumpkin-crop would require two ploughings, and two hoeings, while growing; and another good ploughing would then be requisite to fit the ground for the reception of the wheat. The intervention, therefore, of the crop of pumpkins would require the two ploughings, which are requisite for it while growing, more than is usually given to land when Summer-fallowed in the usual way. By breaking up the ground in the Fall preceding, the loss of some Spring-pasture would also be incured.

Let us now compute the expense of raising, and gathering, an acre of pumpkins; and then the clear profits of the crop will more readily appear.

CROP, DR.	*Dols.*	*Cts.*
For planting, half a days labor		50
Two ploughings, half a days labor each time, with one Horse and plough	2	
Two hoeings, one days labor	1	
Gathering, one days labor, with Horses and wagon	2	50
Clearing the ground of the vines, half a days labor		50
Seed		25
Loss of Spring-pasture	1	
Rent of the ground	3	
	$10	75

CR.	Dols.	Cts.
By ten tons of pumpkins, at sixteen cents per hundred	32	
Clear profits of the crop	21	25

Suppose it would be found necessary to expend three dollars more, in manuring for the crop, in the hills, before planting, in order to raise the quantity above stated; there would then remain eighteen dollars and twenty-five cents of clear profit to the acre; an amount of profit which Farmers in this Country do but seldom realize.

If the above calculations should be found correct; and this can be easily ascertained by experiment; let the Farmer pursue this system of culture, by having his pumpkin-crop to precede his crop of wheat, instead of the present method of Summer-fallowing; let him apply his pumpkins to feeding and fating of cattle; and in this way he will find that his ten-acre field will give him one hundred and eighty dollars, of clear profit, more than he derives from it by his present mode of culture, in raising his crop of wheat. And, this calculation being founded on what it is supposed may be derived from the common pumpkin, it is only necessary to add, that, if the kind first mentioned should answer the expectations formed of it, the clear profits it will afford will probably be three or fourfold greater.

It is believed that pumpkins are considerably improved, as an article of food, for fating of Swine particularly, by being steamboiled; and perhaps the same may be observed of them, when used for fating Neat-cattle.

As they contain a large portion of saccharine matter, they would, no doubt, afford considerable of molasses, or of ardent spirits, when distiled. It is, most probably, their highly-saccharine quality which gives them a superiority for the purpose of fating.

Pumpkins will grow well on every kind of soil that is fit for hoed crops, and the richer the better. In raising them, it is usual to mix them with the crop of Indian corn: But it is doubtful whether any thing is ever gained by raising two growing crops together. Let the crop be planted by itself; and in planting give the hills plenty of seeds, in order that if some of the young plants should be destroyed by insects there might still be enough left.

See INSECTS, for an easy method of keeping them from plants of this description.

Pumpkins are excelent for fating Horses. They, however, do not relish them at first; and therefore must be kept from feeding, till they are hungry, before the pumpkins are offered to them; and let a little salt be first sprinkled on this food; when they will soon grow fond of it, and eat it readily, without salt.

Pumpkins may be kept in a cellar, for this purpose, a considerable part of the Winter; but the cellar must not be too warm; and care must be taken not to break off the stems of pumpkins, but leave these attached to them; otherwise they will soon commence roting, at the places where the stems are broken off.

PYRITES. *See* MANURES.

* * *

Q.

QUINCETREE (*Pyrus Cydonia.*) This tree is easily raised from layers or cutings. A moist soil suits it best. Let the cutings be planted early in the Spring, and watered in dry warm weather. The trees require but little pruning, except to keep them clear of suckers, dead and cross limbs; and where they have too many luxuriant upright shoots, in the top, these should be taken out.

Mr. *Forsyth* says, they are apt to have rough bark, and to be barkbound. In this case, he directs to shave off the rough bark, scarify them, and then to brush them over with his composition.

He says, they should be planted at some distance from apple and peartrees, lest their farina should mix, which will cause the apples and pears to degenerate.

Mr. *Matlack*, of Philadelphia, says that quinces afford a liquor but little, if any, inferior to the best grape. If this be correct, would not the extensive culture of this tree be found very profitable?

See NURSERY, FRUIT-TREES, TRANSPLANTING, &c.

* * *

R.

RABBITS. 'In some situations, these animals may be kept to advantage, as they multiply exceedingly, and require no trouble in bringing up. They delight in the sides of sandy hills, which are generally unproductive when tilled; but level ground is improper for them. The fur of the

Rabbit is worth thrice the value of the carcase. Therefore, supposing the Rabbit to consume a quantity of food in proportion to its carcase, it is a species of stock nearly three times as valuable as either cattle or Sheep.

'Rabbit-warrens ought to be enclosed with a stone or sod wall; and at their first stocking it will be necessary to form burrows for them, until they have time to make them for themselves. Boring the ground horizontally with a large augur is, perhaps, the best method that can be practised. Eagles, kites, and other birds of prey, as well as cats, weasels, and polecats, are great enemies of Rabbits. The Norfolk Warreners catch the birds by traps placed on the tops of stumps or trees, or artificial hillocks of conical form, on which they naturally alight.' *Encyclop.*

Would not the rearing of Rabbits be profitable in this Country? We have no eagles or kites to molest them; they breed very rapidly; their food is cheap and easily provided. A fence to enclose a warren can be made of boards, at no great expense, which will keep out cats and polecats; and as for weasels, we have but very few of them in this Country.

RADISH (*Raphanus.*) This root being liable to be eaten by worms, the following method is recommended for raising them: Take equal quantities of buckwheat-bran, and fresh horsedung, and mix them well and plentifully in the ground by diging. Suddenly after this a great fermentation will be produced, and numbers of toadstools will start up in forty-eight hours. Dig the ground over again and sow the seed, and the radishes will grow with great rapidity and be free from the attacks of insects. They will grow uncommonly large. Buckwheat-bran is an excelent manure of itself.

RATS. These are unprofitable for the Farmer to maintain, and the sooner he disposes of them the better. For this purpose, the most effectual method is to give them arsenic. Set some plates where the Rats frequent, with a little wheat-flour put into them; let them bait on this for two or three nights; then add a little arsenic to the flour, mix it well together, and place it as before, and they will eat it very readily, which will soon dispatch them. When this dose is administered, care should be taken to cover the milk-pans and whatever else they can drink at, as the arsenic occasions a burning thirst, which induces them to go in quest of whatever will quench it. Perhaps it would be as well to set some water for them to drink, at proper places.

A trap, that is much recommended, for catching Rats, is made as follows: Take a barrel, or keg, with one head out; put in it water enough to cover the bottom about two inches deep; in the middle of this set a piece of brick or stone; cover the head of the cask with a piece of smooth parchment; or, perhaps, smooth stiff paper will answer; in the centre of this cut two slits about six inches long, at right angles, so as to form a cross; immediately over this suspend the best kind of bait for Rats, placed sufficiently high.

When the Rat comes to take the bait, in reaching up to it he slips into the hole, by the four corners of the parchment or paper giving way. He then gets upon the brick in the middle of the water, and begins to utter cries of distress. This brings others to him, who fall in the same manner. Presently they begin to fight for the possession of the brick, and the noise of this brings others, who fall in like manner; and thus all within hearing of this scene of confusion follow on and share the same fate.

Another good method is, by suitable baits to draw them into a large box, or cage, by means of an entrance guarded within with sharp-pointed wires, similar to those of the mousecage.

While the Farmer is divesting himself of his Rats, let him not neglect his Mice; for they, too, are quite expensive in keeping.

RED-TOP. *See* Grasses.

RICE (*Oriza Sativa.*) This plant may be considered in some degree amphibious; for, after it has attained some height, the ground growing it may be occasionally flooded with water, till the crop comes to maturity. In this manner it is raised in the Southern States; the overflowing of the ground being merely for the purpose of saving the labor necessary to be performed in the ploughings and hoeings the crops requires, when not thus irrigated.

It will, however, grow very well on dry lands, if they are sufficiently rich. It has been successfully raised, by Mr. *Boardman*, on dry sandy land at Annapolis, in Maryland, as we find stated in the Domestic Encyclopedia, published in Philadelphia.

We mention this fact for two purposes; first, to observe that the crop does not require irrigation; and that although, by this operation, there may be a saving of labor, still a very great loss is thereby incured, in regard to health, and of course enjoyment; and, second, that although this plant is a native of the tropics, still it is capable of becoming naturalized to cooler and shorter Summers.

There seems, indeed, a natural disposition in plants to accommodate themselves to the climate in which they are cultivated. If they have been long grown in warm and lengthy Summers, their growth, and the time required for it, become proportionately increased, and *vice versa*, when gradually accustomed to cooler and shorter Summers.

Calculating, therefore, on this disposition of plants, we think it not improbable that the culture of rice may gradually work its way into more northerly climates, till it will be found practicable to mature the crop in almost every part of the United States; and although the plant will be found diminished in size, as it is grown farther to the north; yet, as on that account it will admit of being planted more closely, it will probably suffer no diminution of its product in grain.

We believe that almost every kind of soil is fited for the growth of rice, that is sufficiently moist and rich. We have even seen it flourish on a moist sandy loam, in North-carolina.

Early in the Spring, the ground is to be fited with the plough for the reception of the seed, which is to be drilled in, in rows, at the distance of about twenty-seven inches apart. When the young plants have acquired a suitable height, the weeds are to be eradicated from the crop with the plough, or with a small harrow, to be guided by handles behind, run twice between the rows, and the work is then completed with the hoe, and perhaps some hand-weeding.

In due season, after this, the water is to be occasionally let on the ground, for the purpose of killing the weeds and grass; and then to be let off again, in order that the crop may have such further ploughing and hoeing as may be necessary. If water is not to be used, the growing crop is to be kept clear of weeds, like other hoed crops, till the ground becomes sufficiently shaded to prevent any further trouble from them.

The grain will be found sufficiently ripened, while the stalks are still green; and on this account they are valuable, as a substitute for hay. If the crop be flooded, the water is to be let off in due season, so that the ground can be laid sufficiently dry before harvesting. In regard to this operation, we will merely observe, that he who understands the manner of harvesting wheat, rye, barley, or oats need be at no loss as to the best method of gathering this crop; remembering, however, that the straw should be sufficiently dried before threshing, or storing the crop away.

The separating of the grain from the straw may, no doubt, be advantageously done with a threshing-machine; or it may be performed in any of the other methods of threshing.

See THRESHING.

After the grain is taken from the straw, and winnowed, the hull is taken off, by a mill made for the purpose, which fits the grain for market.

Lands prepared for raising rice, by flooding, are such as were originally swamps, or flat natural meadows. They are prepared for receiving and retaining the water, in a manner similar to that for improving land by *warping*, as it is called.

See IMPROVEMENT OF LAND

If the land is naturally too wet for cultivating rice, it is to be laid drier, by a ditch, of sufficient depth, dug round the field, with the earth thrown on the outer sides; and this earth will serve to form the bank for retaining the waters, when the field is to be flooded. Smaller ditches may also be carried across the field, into the outer ditch, for the purpose of laying the field drier, if it be naturally very moist.

A rice-field thus prepared will bear crops for many years, without any sensible diminution of the fertility of the soil; particularly if it be naturally rich, or if it be assisted by some sediment of the waters with which it is flooded.

The great objection to flooding fields, during the heat of Summer, is the prevalence of malignant fevers which this practice occasions. Whatever advantages the fields derive from flooding, in repairing that exhaustion of the soil which yearly croping must occasion, might be obtained with equal ease by leting on the waters during the Winter season, or when they have most sediment to deposit.

Whether, then, the benefit to be derived in the saving of labor, by flooding in Summer, is more than sufficient to overbalance the evil just mentioned, which is thus occasioned, may perhaps be very doubtful; and perhaps it may be a matter of less doubt, whether it would not ultimately be more beneficial to convert all the rice-lands into grass-grounds, for feeding and soiling cattle, by stocking them with the best grasses.

See GRASSES. SOILING, &c.

The Southern States have eminent advantages, if rightly improved, for raising great numbers of cattle, and where these greatly abound the lands may be increasing in fertility, and, of course, wealth; while the country that has few or no cattle must, sooner or later, exhibit a very different appearance.

Rice is not a very exhausting crop, owing, no doubt, to its being fit to harvest while the stalks are still green. When grown on uplands, the growth of the crop might perhaps be very considerably assisted by the use of gypsum, applied in the usual way to the ground; or to roll the seeds in, after being soaked in some fertilizing liquor: And if such upland were sufficiently rich, we can see no reason why the crop might not be successfully raised, by sowing the seed in the broadcast way; especially if the crop were once gone over with the hoe, for the purpose of thining the plants where they might stand too closely, as well as for eradicating the first growth of weeds.

RIDGLING. A name given to a half-castrated animal. A Horse of this description is as troublesome as a Stallion, and yet not fit to be relied on as one. 'A ridgling Hog (says Mr. *Deane*) will never be fat, nor grow so large as a Barrow, till his castration be completed; as it may be, by making an opening in the belly, when the case is most difficult. They should either be killed young, or completely castrated. The flesh of a ridgling Pig is good; but that of an old one, brawny and disagreeable.'

ROLLER AND ROLLING. The roller is useful in smoothing the surface of meadows that have become uneven, and for passing over grounds newly sown with grain, or that are to be laid down to grass. They are further useful in breaking the lumps of baked earth in a clay-soil; but, for this purpose, a roller filled with iron spikes has been prefered by some.

See SPIKY-ROLLER.

The use of the roller on grounds sowed with different kinds of grain, particularly barley, which is dry and husky, is to cause the mould to enclose the seeds; much of which, by lying in cavities that soon become dried, would otherwise fail of vegetating. It is also useful in light dry soils, for preventing their moisture from evaporating too easily. Perhaps the roller is as useful for this purpose as for any other, in regard to its application to crops of grain. It is also useful in depriving certain insects of their hiding-places in the cavities of the soil.

The rolling of land, in tillage, should be done when the ground is so dry that it will not stick to the roller; and in grass-lands, it should be performed in the Spring, when the ground is soft and wet.

A wooden roller should be about twenty inches or two feet in diameter, and about six feet in length. It should be round and of an uniform surface. Where the roller is made of stone, it should be about fourteen inches in diameter, and of the length above mentioned.

ROOTS. The most essential divisions of these, are those of the *tap*, the *bulbous*, and the *fibrous* kinds. The carrot, parsnip, beet, clover, &c. are taprooted; the potatoe, onion, turnip, &c. are bulbous; the plants of wheat, barley, oats, herdsgrass, &c. have fibrous roots. Taproots have also fibrous roots, which, like all others of that kind, extend horizontally, far in every direction, and become so fine that they are imperceptible to the naked eye. The bulbous have also such fibrous roots, and one kind, the turnip, has also a taproot in addition to its fibrous roots. Trees have also tap and fibrous roots.

Some taproots will extent downward, as far as they can find the soil sufficiently opened to receive them. We have known an instance of a parsnip taken from the ground, three feet in length. This shows the necessity of having the soil deeply mellowed for taproots; and the fibrous roots extending horizontally so far in every direction, where they can find mellow earth to penetrate, shows the necessity of having the ground well mellowed to a sufficient depth to receive them.

RUNET, or RENET. A good method of making this is as follows: Take the maw of the Calf; empty it of its curd; wash it; soak it in strong brine till it is well salted; dry it on bows made for the purpose; then take two quarts of strong brine that will bear an egg, blood-warm, and let the maw steep in this twenty-four hours, when the liquor will be fit for use; bottle it up, and cork it tight, and it will keep for a twelvemonth. About a teacup-full will be sufficient for ten Cows. Some direct spices, and a lemon sliced, to be put into this liquor.

Another method is, to take the maw, emptied as before, and fill it with an artificial curd made of new cream; into which put three eggs beat fine; a nutmeg grated fine; and three teacup-fulls of fine salt; mix the mass well together; tie up the mouth of the bag; lay it under a strong brine for three days, turning it over daily; then hang it up in a dry cool place for six weeks, when it will be fit for use. When used, it is first to be dissolved in warm water.

The acid contained in the maw is very apt to become rancid, and to putrify, if a sufficiency of salt be not applied; care must therefore be taken to prevent this, by a due supply of this article. No good cheese can be made, unless the runet be good.

The runetbag may also be salted and dried, as before directed, and pieces of it occasionally used, by being previously soaked in warm water, and a quantity of this water used, in proportion to the quantity of milk to be turned.

In Holland, the Cheesemakers use no runet; but, instead of this, they use a small portion of spirit of seasalt (*muriatic acid*) for forming the curd. This gives the cheese a taste somewhat different from that made with runet. The acid should probably be diluted. The quantity, which is just sufficient, may be ascertained by a few experiments.

RYE (*Secale.*) There is but one kind of rye; but this may be made either Winter-rye, or Spring-rye, by gradually habituating it to different times of sowing. Take Winter-rye, for instance, and sow it later and later, each Fall, and it may at length be sown in the Spring; and then it becomes Spring-rye.

On the contrary, sow Spring-rye very late in the Fall, at first, and you may gradually sow it earlier each succeeding year, until it may even be sown in May, and used the first season for pasture, or mowing, and then grown to perfection the second year.

Soils of a sandy or gravelly texture are the most natural for rye. Almost every kind of dry soil is more or less suited to its growth; it will even grow tolerably well in bog-meadows, when laid sufficiently dry It will produce considerably on the poorest soils; and prodigious crops of it may be raised on such as are made very rich, as may be seen from a case reported by Mr. *L'Hommedieu.*

A Neighbor of his manured twenty square rods of ground with four thousand Monhaddan fish, and sowed it with rye. In the Spring, it was twice successively eaten off, close to the ground, by Sheep breaking in, after it had acquired a height of nine inches the first time, and six inches the latter. These cropings, however, only served to make it grow thicker and stronger than before; and, when harvested, it produced sixteen bushels, or, at the rate of one hundred and twenty-eight bushels to the acre; giving to the Owner, according to the calculation of Mr. *L'Hommedieu*, at the rate of eighty-five dollars to the acre, of clear profit.

He supposes, however, that the crop would have been entirely lost, had it not been twice eaten off by the Sheep. It is said that prodigious crops of wheat may be raised in the same manner.

Rye is subject to rust, but seldom or never to smut; nor, indeed, to any other disease that we know of, in this Country. Mr. *Du Hamel* makes mention of a disease it is subject to in France, called the *spur*, which causes a dry gangrene in the extreme parts of the bodies of those who eat the grain thus diseased; so that these parts at length fall off, almost without pain.

'The Hotel Dieu, at Orleans (says this Author) has had many of these miserable Objects, who had not any thing more remaining than the bare trunk of the body; and yet lived, in that condition, many days.'

The grains thus diseased are larger than the rest, mostly crooked, bitter to the taste, rough, deeply furrowed from end to end, and project considerably beyond their husks. It is not every year, however, that the spur produces these effects in that Country; and if the grain be kept some considerable length of time, before it is eaten, it will not prove hurtful.

We notice this disease of rye, in order that, if similar effects should ever be produced from it here, the cause of any such malady, and the means of obviating it, may be more readily understood.

Rye may be raised for many years in succession on the same ground, without materially exhausting the soil, particularly if it be perfectly suitable to the growth of this grain; and provided, also, that the stubble be turned under immediately after taking off the crop: But where the ground is suffered to remain unploughed, till the stubble has become divested of all its moisture, and the seeds of the weeds have ripened, the successive crops will gradually lessen in product, and the weeds will increase.

We would, however, by no means recommend such a mode of culture, unless as much as twenty-five bushels, or more, of this grain could be yearly had from the acre; as such a yearly product would probably afford a clear profit, to the acre, of half that number of bushels; and such a profit, in some of the lighter, and in some of the harder, kinds of soils, is not to be despised.

As the soil most suitable for rye is usually that which is most benefited by the use of gypsum, it would be much the better plan, instead of successive crops of Winter-rye, to sow this grain, and Spring-rye, alternately, in order that the ground might, every other year, be enriched by the application of this manure.

The growing crop of rye receives no benefit from the application of this manure; but it quickly covers the ground with a fine sward of white-clover; and, as soon as ground is thus swarded, it is in good condition for bearing any crop. Let the gypsum, therefore, be sown in the Spring, on the growing crop of Winter-rye; and, by the middle of October following, the ground will be covered with white-clover; turn this sward over in the latter end of the Fall, and in the Spring sow a crop of Spring-rye; and, as soon as this is taken off, turn the ground over again for a crop of Winter-rye; and in the Spring repeat the process of manuring with gypsum, as before, for a crop of Spring-rye, and thus proceed with these crops alternately.

In this way, we will venture to say, that nearly double the amount of grain might be obtained, in each crop; particularly in the northerly part of our Country, where Spring-rye is nearly as productive as that of Winter.

In such a mode of culture, however, particular attention should be paid to turning under the stubble of the crop of Spring-rye as quick as possible, in order that the seeds of the growing weeds be prevented from ripening, as well as for enabling other seeds, which may lie buried in the soil, to vegetate, and thus be destroyed by the after ploughing and harrowing for puting in the next crop.

Many Farmers may have pieces of hard gravelly, or very light sandy, soil; for which such a mode of culture might probably be found as profitable as any to which the land could be applied: But of this, the judicious Farmer will be best enabled to judge, after obtaining a full knowledge of what mode of culture is most profitable for his more sterile grounds; and, in order to this, he must estimate the expenses of puting in his crops; the clear profits, after paying these expenses, and the rent of the land; and, whether his lands are likely to become, eventually, more exhausted by such mode of culture, than by a change of crops, where grasses, suitable to the soil, should be cultivated, during some seasons.

See further, CHANGE OF CROPS in regard to hard gravels, and TURNIPS for light sandy lands.

Where Winter-rye is early sown, a bushel to the acre is probably sufficient; but, of Spring-rye, a bushel and a half, to the acre, or perhaps more, should be sown.

Rye, intended for family-use, should be harvested as early as the grain can be prevented from shrinking, and let lie on the ground a day or two, to harden. In this way, the grain will make much whiter flour; though, perhaps, the product will not be quite so heavy and bulky, as when left till fully ripened. Probably all that is gained by leting the grain fully ripen, before harvesting, is an additional thickness of the skin; thereby increasing the quantity of bran, but not of flour.

Bread made entirely of rye is laxative, and good to prevent costiveness. Wheat, especially where the flour is very fine, has an opposite tendency. For most constitutions, therefore, bread made of equal parts of these grains is considered the most conducive to health Mixing some flour of Indian corn, with that of rye, will serve to prevent its clamminess.

S.

SALSAFY (*Tragopogon*) This root is frequently called *Vegetable Oyster*, on account of its having a resemblance, in flavor, to that of an oyster. When boiled, mashed, and mixed with butter, and formed in shape of oysters, and then fried, it is frequently mistaken for fried oysters.

It requires a culture similar to that of carrots, &c. The roots are to be dug in the Fall, and protected from the Winter-frost. Like all other roots, they are best preserved in moist sand.

SALTS. *See* MANURES.

SALTING OF MEAT. In packing down pork, sprinkle in what is equal to four quarts of rock-salt to a barrel; then make a pickle, sufficient to cover all the meat, as strong as it can be made with salt, and when cold pour it on. When the pickle becomes considerably colored with the blood of the meat, draw it off, boil it, take off the scum, till it become clear, and apply it again. Repeat this, if the pickle again become colored too much, and add more fresh brine, if necessary. In this way, pork will keep sweet throughout the ensuing Summer, and will be free of rust.

This method is also good for preserving beef, though the following is better:

For a barrel of beef, says Mr. *Deane*, take four quarts of rock-salt pounded fine; eight ounces of saltpetre, and five pounds of brown sugar; mix them well together, and with these ingredients pack the meat down very closely, so as that they will of themselves cover the whole with brine. The next Spring draw off the brine, clarify it, as before directed, adding a little salt to it, and apply it again, and the beef will keep very sweet and fine-tasted during the whole Summer following.

This method of curing meat, it will be seen, is something similar to the best method of curing butter, and it is also an excelent method for curing pork and hams. The ham of some of the Southern States is allowed to be equal to that of Westphalia; but, whether this be owing to this method of curing, to the climate, or to the manner of [illegible]eeping Hogs there, is perhaps uncertain. When hams [illegible]e been sufficiently cured in this, or any other way, they should be smeared over with molasses; smoked sufficiently and suddenly; the quicker the better; and let them then be well sprinkled over with slaked lime, and put away in casks, filled with bran, to keep during the Summer. The lime will serve to keep all insects from them.

SAND. *See* EARTHS and MANURES.

SAP. Plants derive their sap principally from the roots. Before it has entered these, it is called the *food of plants*. It is supposed to be absorbed by the capillary roots in the form of vapor, which, being rarified by the heat of the atmosphere, ascends, and extends through all the pores of the plant; and here is imperceptibly carried on that chemical process, which eventually serves to bring it to perfection.

SCRATCHES. This is a disease in the legs of Horses, occasioned by bad blood, or too hard labor. The skin of the legs becomes craked open, emiting a redish-colored humor. To cure the disease, wash the cracks with soapsuds, and then rub them twice a day with an ointment of hogs-lard, mixed with a little sublimate mercury.

Another says that this troublesome disorder may be effectually cured, by the application of as strong a solution, of copperas in water, as can be made, and rubing the legs up and down, with a cob, each time. A few applications will be sufficient.

SEEDS. Many seeds will retain their vegetative faculty for several years; others again cannot be made to germinate after the first year, unless uncommon pains be taken for that purpose.

All seeds require fresh air, and if long deprived of this they will lose their vegetative quality. If some kinds be buried deeply under ground, however, they will retain this quality for twenty or thirty years.

Some seeds will lie a year, some two or three years, before they will come up; and for this reason, when seeds are brought from a distant country and sown, the ground should not be disturbed during that length of time.

Seeds of the dry kinds are best preserved in their pods, or natural coverings; but those of all soft fruits, &c. should be taken out, cleansed, and dried.

By experiments made by Mr. *Humbolt*, in 1793, it was found that seeds which require thirty hours to germinate in common [illegible]ter, could be made to germinate in six hours in *oxygenated muriatic acid gas*, mixed with water; and by adding ‘ the stimulus of *caloric* (heat) to that of the oxygene, he was enabled still more to accelerate the progress of vegetation.’ He took the seeds of garden-cresses, peas, French-beans, garden-lettuce, mignonette; equal quantities of which were thrown into pure water, and the oxygenated muriatic acid, at a temperature of eighty-eight degrees Fahrenheit. Cresses exhibited germs in three hours, in this acid; while none were seen in the water, till the end of twenty-six hours.

By means of this stimulant, seeds which were more than an hundred years old were made to vegetate; as were other seeds which had been kept for thirty years, at the botanical garden at Vienna, which had resisted every other means used for that purpose.

The application of this may be found useful in planting Indian corn, as it will be sooner out of the way of birds and squirrels; and, when the first planting has failed, or when birds, &c. have pulled up the corn, this method would greatly accelerate the growth of a second planting. It is also useful for many kinds of garden-seeds, which have been kept over one year. Probably, the seeds of the American thorn might, also, in this way, be made to vegetate readily, and that hempseed might thus be made to grow, after the first year.

Another method of making old seeds germinate, more readily, is, to immerse them in water, nearly boiling hot, for the space of half a minute; then suddenly cool them by exposure to the air, and sow them when the soil is well warmed by the sun. If sown, however, when the earth is cold, they will rot in the ground.

SHEEP. Mr. *Livingston* has treated this subject with so much research and ability, that the Reader need require little or no further information, than what his Essays contain; but as this Work would be imperfect, without treating of this important article, and as the Writings of Mr. *Livingston* and others are too voluminous for insertion, it becomes necessary to condense the subject, so as to present it in a small compass.

Animals undergo changes by domestication. Qualities which they possessed in the wild state, but which are no longer useful in the domestic, become less and less visible; and owing, perhaps, to this circumstance, and to others, even their appearance becomes more or less altered. The ears of wild animals are erect, which enables them to hear with more acuteness; but some of the Sheep of Sicily and of Italy, says Mr. *Livingston*, have been so long under the protection of Man, where this quality is not so requisite, that their ears have become pendant. Lord *Kaims* observes, that when Sheep run wild they go in droves; that the males are the protectors of the flock, and that the strongest claims precedence of the rest; that when they lie down, at night, some stand as sentinels, while the rest sleep: But these traits of instinctive sagacity they, in a great measure, lose when Man becomes their Protector.

M. *Buffon* and others have supposed the *Mouflon Musmon*, or *Argali*, which is still found in the wild state, to be the original stock of the present Sheep. This animal is swift of foot, and in cold climates has merely a coat of wool under a coat of hair. In warm climates, it has nothing but a coat of hair; and such is the case with Sheep which have been long accustomed to such climates.

It would seem to be the economy of Nature, that some graminivorous animals, when domesticated, but still exposed to the rigors of the seasons, become more inert, of course possess less animal heat, and therefore require a more woolly coat: While others of the carnivorous kind, which are more sheltered by Man, but whose habits still require their wonted activity, and of course retain their animal heat, require less clothing, or a mere coat of coarse hair. This, perhaps, may be the reason why Sheep have more wool and less activity than the Argali; and why Dogs have coarser hair than Wolves.

If this, however, be thought sufficient to account for the difference between the Argali and such Sheep as shed their coats yearly, it is still difficult to assign a reason why the Merino Sheep never sheds its coat; for this, if left on for years, does not fall off, but constantly increases in length and quantity. Probably different climates and soils have done much, in producing marked differences among Sheep; and probably different kinds, as we now find them, have descended from stock which were of the same genus, but possessing properties different from each other.

Mr. *Livingston* observes, that 'as this quadruped has probably been found throughout all the mountainous parts of Europe and Asia, and perhaps even in Africa; as its young are easily tamed; as its milk, its flesh, and its skin are extremely valuable to Man, in a savage state; it is highly probable that it was amongst the first quadrupeds that were domesticated; and from this circumstance it has, perhaps, wrought no less a change in Man, than Man has in it;' that it 'is highly probable we are indebted to it for the conversion of Man, from the wild wandering Savage, to the mild and gentle Shepherd.'

It may be found equally true, that different soils are best suited to different breeds of Sheep; and that the soil often serves eventually to produce a difference in Sheep. 'Fat pastures (says *Mortimer*) breed straight, tall Sheep; and the barren hills, short, square ones.'

The island, called *Smithsisland*, lying off the eastern cape of Virginia, has been found remarkable for producing a breed of Sheep of uncommonly fine wool.

The large longwooled Sheep of Greatbritain require rich pastures; and a moist soil will suit them better, perhaps, than it will any other Sheep. A wet soil, salt marshes excepted, is, however, unfriendly to Sheep of all kinds. The Merino Sheep require good pastures, and such as is produced on dry soils. Farmers, in stocking their farms with Sheep, ought to pay attention to the selection of such as are best suited to their soil. Much of the high moist lands of this and the neighboring counties, it is believed, would be found tolerably suitable for raising the large long-wooled English Sheep.

It is highly desirable that our Country should be stocked with Sheep of various kinds, in order to supply itself with the various sorts of cloths which are necessary in different uses. In England, they have the *Teeswater*, the *Lincolnshire*, and the *Dartmoor* breeds, which yield fleeces of long coarse wool, weighing on an average from eight to eleven pounds; and the average weight of their carcases, per quarter, is from twenty-five to thirty pounds. The wool of these Sheep, and of the *Heath*, *Exmore*, and *Berkshire* breeds, which are smaller, and have still coarser wool, is proper for the manufacture of blankets, carpets, &c.

The *Newleicestershire*, or *Bakewell* breed, and the *Cartwold* and *Romney-marsh* breeds, have also long wool, but somewhat finer, being better fited for the manufacture of worsted fabrics; and the average weight of their fleeces is from eight to nine pounds; the average weight of their carcases, per quarter, is from twenty-two to twenty-four pounds.

The *Bakewell* is an improved breed, which was engrafted upon some of those before mentioned, and are highly esteemed for the fatness of their carcases, and the fine taste of their mutton.

In addition to these, the English have various other breeds besides the Merino, yielding fleeces of short wool of various quantities and qualities; the finest of which are the *Dunfaced* and *Shetland* breeds; the next finest is the *Hereford* or *Ryeland* breed, and the next the *South-down*.

Mr. *Livingston* says the latter very much resemble our common Sheep, having wool about equally fine; and that in England they are esteemed next to the Bakewell breed.

Mr. *Custis*, of Virginia, is rearing a new breed, which he calls the *Arlington* Sheep, that yield fleeces of long wool, well fited for the manufacture of worsted fabrics. They are a mixture of the Bakewell breed with a long-wooled Persian Ram, which was imported by General *Washington*. They promise to be a valuable acquisition to our Country.

In addition to these are the *Smithsisland* Sheep, before mentioned, which are also the property of Mr. *Custis*, and which, on account of the fineness and largeness of their fleeces, promise to be highly valuable, provided the breed do not degenerate in a few years, when taken from that island. They are shorn twice a year, and some of the fleeces weigh four pounds at each shearing.

Another breed of Sheep ought to be noticed, as being peculiar to this Country: These are the *Otter* Sheep, so called on account of the length of their bodies and the shortness of their legs. They were first found in some of our Atlantic islands, and are indeed a rickety, crippled-looking race. Their wool is of a medium fineness, and of a medium length: It is neither of a proper length for combing, nor yet for broadcloths.

The advantages of this breed consist chiefly in their inability to be mischievous, in leaping fences, &c and their disadvantages consist in their proportionate inability to escape from Dogs, &c. But the Man of taste and feeling will make another objection to them; their form is not pleasing to the eye, and their rickety, hobbling gait is calculated to excite pity, instead of pleasure.

Another breed of Sheep, which are found in almost every quarter of the globe, are the *Broadtailed* Sheep. These are of different kinds, and yield fleeces of different qualities in different climates. In the Levant, their wool is fine; at the Cape of Goodhope, it is coarse; and at Madagascar, it is mere hair. They are generally larger than the European Sheep, and the tails of one kind weigh, in many instances, fifty pounds; being 'so weighty that the Shepherds are compeled to place two little wheels under each, to enable the Sheep to drag them.'

'The composition of this excrescence (says Mr. *Livingston*) is said to be a mixture of flesh with a great proportion of fat, and to be very delicate food; but the animal has little other fat, the tail being in him the repository of that fat which lies about the loins of other Sheep.'

As it is hardly probable that this excresence could have been inherent in the original stock, whence these Sheep descended; but has most probably been produced, either by accident or by art: It is, perhaps, one of the most extraordinary instances, to be found, of an alteration produced in the form of an animal by domestication.

A yearling Sheep has at its first shearing two *broad* teeth before, beside its narrow teeth; when sheared the second time, it has four; the third time, six; and the fourth, eight. They are then said to be *full mouthed.* The teeth of Ewes begin to decay at the age of five years; those of Wethers, at seven; and of Rams, at eight. At this age, a Ram should be castrated, and turned off to faten with other old Sheep. Ewes will faten faster during pregnancy than at any other time.

If properly kept, and no accident befal them during pregnancy, they are capable of yeaning till the age of ten or twelve; but they frequently become barren much sooner, by reason of poor keeping, or by injuries received during pregnancy. When this is the case, and they grow weakly, they should be fatened with other old Sheep.

Those set apart for fating should be kept separate, on good feed, and have some Indian meal daily. It is said that a Sheep is never made very fat but once, and that then is the proper time to kill it: But, perhaps, this is not founded in truth.

The proper time for shearing is, when the weather has set in pretty warm; but sooner, where the wool is falling off. The wool of Merino Sheep must be washed after shearing, as it cannot be washed to any effect while on their backs. The shearing of these may be later, as their wool never falls off. Sheep of the common kinds may have their wool washed while on their backs; but in that case they should be kept some days previous to shearing in a clean pasture, in order that their wool may again imbibe some of the oil which is lost by washing, which will render the shearing more easy, and require less oil to be afterwards added for spining.

In shearing, care should be taken not to cut them; and this is more particularly necessary with the Merino Sheep, whose fleece is so close as to render this operation much more slow and difficult, double the time at least being requisite for shearing one of these, that is necessary for one of the common kind. Would not shears, with blades much *narrower* than those of the common kind, be much the best for shearing these Sheep?

In England, it is a common practice, after shearing, to smear the bodies of the Sheep with a mixture of tar and fresh butter, which serves to cure the wounds in the skin, and to fortify their bodies against the cold. This mixture may be improved by the addition of a small quantity of sulphur. The Sheep should again be anointed in the month of August, by introducing the ointment from head to tail, and also on the sides and back, by parting the wool for the purpose. This composition should, at all events, be applied to the wounds. It serves effectually to destroy all the ticks, which are very pernicious to Sheep.

The practice of pening up large flocks of Sheep together in a close place, during the shearing, is very injudicious: They should be pened up in the open air, and but a few brought together at a time. The common practice of tying the legs of the Sheep together, while shearing, is hurtful to them; as it compresses them into a situation which is unnatural and painful Rather let each foot be tied by itself, in its natural position, to a small piece of wood, with cross pieces at each end, which may be easily contrived and made for the purpose.

During cold rains and cold nights, after shearing, they should be placed where they can go into their house, or place of shelter, when they please; as they know best when they want shelter, and when they become so warm as to require the open air. They should at all times, but particularly at this, have plenty of salt, as this is a stimulant which enables them the better to withstand the cold. A warm sun is hurtful to the backs of Sheep after shearing, and for this reason their pasture should have some shade, to which they can retire during the heat of the day.

After shearing, their skins should be carefully examined, to see if they have any appearance of the *scab;* and those which have, should be kept apart from the rest, till cured, as this disease is contagious. This, too, is the proper time to examine them, as to their *age* and *health*, their *bodily defects;* and also, as to the *quality* and *quantity* of their fleeces. Those which are found old and broken-mouthed, sickly and infirm, ill-formed; Ewes that are bad nurses, and lose their Lambs from want of milk; those whose wool is in small quantities, which is often the effect of age or sickness; and those whose wool is bad, either by being mixed with short hairs, or which are rough on the thighs: These should all be marked, in order to be turned off, and put in good pasture for fating.

The wool of yearling Sheep should be kept by itself; because, not having the same texture or strength which the wool of older Sheep has, it will make the cloth shrink unequally, if mixed with such wool. The other fleeces may be sorted at shearingtime, making separate parcels of the thighs, the belly, and the back and sides. Wool should not be kept long without washing, as in that case it is liable to ferment and spoil in hot weather.

After shearing, the horned Sheep should be examined, to see that their horns do not press on the scull, or endanger the eyes; either of which may kill the animal. Where this is the case, the horns are to be taken off; and, for this purpose, Mr. *Livingston* recommends sawing them off with a fine stiff-backed saw; then apply some tar to the stumps, and tie a double linen cloth over them, to keep off the flies.

At this time also the Lambs should be docked, castrated, and marked. Mr *Livingston* recommends the Spanish custom of docking the tail, as conducive to cleanliness. The castration is best performed by taking away the testicles at once. This operation may be performed on Lambs when not more than ten days old, and the earlier this is done, the finer will be their wool and flesh. If rain or cold weather succeed this operation, before they are cured, they should be housed; otherwise they will be in danger of dying.

Another method of castration, which is probably best for grown Sheep, is to tie a cord tightly round the scrotum, and after five or six days, when the part below the cord is dead, cut it off just below the string, and tar the wound. This is, however, a dangerous operation when the weather is warm: Cool dry weather should be chosen for it.

'In Spain, it is usual, instead of either of these operations, to twist the testicles within the scrotum, so as to knot the cord; in which case they decay gradually, without injuring the Sheep'

Spaying Ewelambs increases their wool, makes them faten better, and it is said improves the taste of their flesh. If this operation is to be performed, which perhaps will seldom be found advisable, it should not be attempted before the Lambs are six weeks old.

Where Ewes are to be turned off for fating, the Lambs must be weaned early; and then let the Ewes have the Ram again, which will make them faten better. Lambs thus weaned should be put in a pasture of young tender grass, out of hearing of their Dams, and an old Wether or Ewe should be put with them. Care must also be taken to milk the Ewes every day or two, for the first week, until their milk dries up.

In all other cases, the weaning of Lambs, before the time when they naturally wean themselves, is believed to be by no means advisable, as the Lambs are injured by it at least as much as the Ewes are benefited. This may, however, be found advisable where it is wished to have the Ewes impregnated earlier than the usual time, for the purpose of raising very early Lambs.

These, Mr. *Livingston* advises, should be shorn the first year; as the divesting them of their fleece may be a matter of some considerable profit, and it renders them more comfortable during the Summer. Lambs, however, which do not come until the snows are gone are always most easily reared; and, in order to this, the Ram must be kept from the Ewes in the Fall until about five months previous to that time. Such Lambs must be kept from the Ram until the second Fall.

In Spain, twenty-five Ewes are allowed to one Ram. Mr. *Livingston* thinks forty by no means too many; and instances are not unfrequent where one Ram has served double and even treble that number. If the Ram, however, be not well kept, where so many Ewes are allowed, he will be in danger of being injured.

The best time for Sheep to feed in pastures is while the dew is on; and this they will readily learn, if there be no water in the fields where they are kept Water is not necessary for them during the season of pasture; but in Winter they should have free access to it, although they can do many days without it.

When Sheep are badly kept they take colds, and discharge a mocus from the nose. Good feeding, together with some pine boughs given them occasionally, will cure this complaint. If pine boughs cannot be had, spread some tar over a board, and over this spread some salt, which will induce the Sheep to lick up all the tar, and this will effect a cure.

According to experiments made by Mr. *Daubenton*, a celebrated French Agriculturalist, it seems that the Sheep of France, which are generally of the height of about twenty inches, eat about eight pounds of grass per day, or two pounds of hay per day, which is about the same thing; as eight pounds of grass, when dried, will make but two pounds of hay. An acre of pasture, then, which in the season would yield of grass what would be equal to two tons of hay, would probably support about eight Sheep through the season. It must be remembered, however, that animals consume food in proportion to their size, and that the Sheep here described are below the common size of Sheep in this Country.

Mr. *Daubenton* also observes, that when his Sheep were fed on dry fodder, during the Winter season, many of the younger ones, and those which were weakly, droped off; that, on opening these, he found the food in the third stomach, or that which receives the food after the second chewing, to be so dry as to be unfit for digestion, and to this cause he ascribes their death. This state of the stomach, he very justly concludes, is produced by the sudden change of food from grass to that of dry fodder; and the remedy pointed out, which is very natural, is merely to feed them with a due proportion of succulent food. For this purpose, carrots, potatoes, turnips, &c. are all very good.

Feeding Sheep with a little Indian corn, about half a gill to each per day, is very beneficial; it keeps the flock in good heart; it enables the Ewes to rear their young much better; and it serves to prevent the wool from falling off in the Spring. Carrots, potatoes, &c. no doubt, answer the same valuable purpose.

For early feeding for the Ewes which have Lambs, a small field of rye, thickly sown, is very good. They may be taken off in time for the crop to come to maturity, and in that case they will do it no injury. A small field of ruta baga would probably be the best. Vetches, clover, tall meadow-oats, and other grasses which start early, are also very good for this purpose.

Sheep should have hay during Winter of the best quality, and for this purpose red-clover is esteemed the best. If about a peck of salt were applied to every ton of hay, when carted into the mow, it would no doubt be found very good for them. The rack in which the hay is put should be upright, so as that, in feeding, the seeds and other matter will not fall into the wool about their necks. Under the rack a trough should be fixed, which will serve for catching the seeds of the hay, as well as for feeding the Sheep.

They should be kept by themselves, and not suffered to run among other cattle; their yard should be spacious, though in proportion to the number in the flock; and their shelter should be close over head, but the sides not so close as to preclude a due circulation of air among them. Perhaps it is best to have it close on all sides but the south.

The shelter ought also to be spacious, so as not to crowd them too closely together; and it should have some small apartments in which to keep the Ewes a few days previous to yeaning, and for two or three days afterwards These should be fed during this time with succulent food, and their apartments should be kept well littered. The fence round the sheep-yard should be such as to keep out Dogs.

If the flock be large, so that a separation of it during Winter would be advisable for promoting the health of the Sheep, the better way is to put the fullgrown Wethers by themselves. This is the more advisable, because they do not require so good keeping as the Ewes and young Sheep; and when kept with these they are enabled, from their superior strength, to take the best and most of the food to themselves.

In regard to folding Sheep, on small or large pieces of ground, *see* Folding of Land

Flocks of Sheep thrive much better by being changed frequently; but those will be most benefited which are taken from poor pastures and put into better. Their pastures should be clear of weeds, as the burs produced by some spoil the wool; while others often prove hurtful to them, by eating; they should also be clear of all briars and bushes; for these serve to tear off much of their wool in the Spring. Clover is the best pasture for them. The evergreen shrub, called *laurel*, is poisonous to them when eaten, and ought therefore to be removed from their walks. This shrub is a species of the *Laurus*, as we believe.

To prevent Wolves from killing Sheep, says Mr. *L'Hommedieu*, make an ointment composed of gunpowder and brimstone, powdered fine and mixed with tar and Currier's oil, and with this anoint the throats of the Sheep. This must be renewed as often as the ointment loses its moisture, which will be four or five times in a season. Wolves have been seen to seize Sheep anointed in this manner, and, finding their throats thus fortified, have left them without doing them any injury.

Having said thus much of Sheep in general, something shall now be said of the *Merino* Sheep in particular.

These Sheep are certainly much the most profitable to raise, where the soil and climate are suitable to them. Perhaps it may be found that some parts of this State may not be so suitable for them as others; as some Farmers of this county (Herkimer) are making complaints of being unsuccessful in rearing them. The climate, and much of the soil, of the Mohawk country is moist, and this circumstance may perhaps not prove so favorable for their propagation here.

Let experiments, however, be fairly and fully made upon them, before any hasty conclusions are drawn. Most of the Sheep of this kind which have been brought into this part of the State were young, and such as were probably rejected from the flocks of those who sent them abroad for sale.

Mr. *Livingston* has stated the result of his Sheepshearing of the Spring of 1808, and this will perhaps serve to convey as adequate an idea of the importance of the Merino Sheep, as any thing that can be said.

From twenty-nine common Sheep, he had upwards of one hundred and fourteen pounds, which he sold at thirty-seven and an half cents per pound. This, allowing one dollar and fifty cents for the expense of keeping each Sheep for a year, fell short three cents on each fleece of paying for their keeping.

Eighty-three half-blooded Ewes gave upwards of three hundred and ninety-three pounds; and forty-seven half-blooded Wethers gave upwards of two hundred and thirty-six pounds. This wool sold for seventy-five cents per pound. Clear profits on the fleece of each Ewe two dollars and three cents; on the fleece of each Wether, two dollars and fifty-five cents.

Thirty threefourth-blooded Ewes gave upwards of one hundred and fifty-six pounds; and three Wethers of the same blood gave upwards of sixteen pounds. This wool sold for one dollar and twenty-five cents per pound. Clear profits on the fleece of each Ewe four dollars and seventy-five cents; on the fleece of each Wether, two dollars and twenty-five cents.

Seven fullbred Ewes gave upwards of thirty-six pounds; and one Ram, fourteen months old, gave upwards of nine pounds. This wool sold for two dollars per pound. Clear profits on the fleece of each Ewe eight dollars and seventy-five cents; on the Ram, seventeen dollars and twenty-five cents. This Wool was all sold at the above prices, without being washed.

By the foregoing, it will be seen, that if the Farmer expects to derive large profits from these Sheep, he ought not to rest until he has got into the fullbloods of this breed, or into the fifteen-sixteenths, which will answer about as well. The profit of the Lambs, it will be seen, is not taken into consideration in this statement

If these Sheep are thus profitable for their wool, it is also well ascertained that they are at least as profitable as any others for fating.

Mr. *Young* took a Merino, weight eighty-four pounds; a half Southdown, quarter Bakewell, and quarter Norfolk, weight one hundred and forty-one pounds; and a Southdown, weight one hundred and thirty-six pounds; these were fed abroad together a certain length of time, and then weighed. The first weighed one hundred pounds; the second, one hundred and forty-eight; and the last, one hundred and forty-four pounds. Thus the Merino gained more than double the quantity of flesh which the other two gained.

He also made another experiment, which served to show that a Merino only eats in proportion to its size By this he found that three Merinos may be maintained four per cent cheaper than two of the Southdowns. The weight of the Merino, upon which this trial was made, was ninety-one pounds; that of the Southdown, one hundred and thirty-two pounds.

Mr. *Livingston* says the size of the Ewes, more than that of the Ram, governs the size of their Lambs; that the Ewes of a small race cannot bear large Lambs, though the Ram be ever so large. For this reason, the Lambs which are raised from a Merino Ram, on our common Ewes, will be larger than those raised from one of our common Rams on Merino Ewes. This is the reason why Rams of the large English breeds, when brought here, do not produce a race any way corresponding to their own size.

Mr. *Livingston* therefore recommends engrafting a Merino stock upon our common Ewes, to increase the size of the breed; though, if they only eat in proportion to their size, this is not so material.

In the selection of the Ewes, take those that are at least three years old, as large as can be obtained of the sort, with the belly large and well covered with wool, chine and loin broad, breast deep, buttocks full, the eyes lively, the bag large, and the teats long. In addition to these qualifications, they must have fine short thick wool, their bellies well covered, and with the least hair on the hinder parts.

In the choice of the Ram, which we will suppose to be threefourth-blooded, and which can be purchased for twenty-five dollars, select one that is of good size, broad in the chine and loins, deep in the carcase, the back straight, the ribs well set out so as to give room for a large belly, well covered with wool, the forehead broad, the eyes lively (a heavy eye being a mark of a diseased Sheep) testicles large and covered with wool: Let him also be strong, close-knit, and active; of which you may judge by taking hold of his hind legs; and, lastly, let his wool be of good quality, and as clear of hair on the hinder parts as possible.

The product of such a Ram, with common Ewes, would be Lambs possessing nine twenty-fourth parts of Merino blood; and twice repeating the process on the Females of the successive products, would give threefourth-blooded Lambs. Two further repetitions from a full-blooded Ram, would give Lambs possessing fifteen-sixteenths of Merino blood, which is probably sufficient. The Ram, however, ought to be changed at each time; as it is believed that the rearing of succeeding stocks, between which there is the closest consanguinity, must eventually tend to degenerate the breed.

In Spain, where by the extent of the pastures the number of the Merinos are limited, it is usual to kill off some of the most indifferent Lambs, and thus two Ewes can be given to suckle one of those surviving. This is usually effected by puting the skin of the dead Lamb over a living one, which commonly induces the Dam of the dead one to recognize the living as her own. Where this fails, the Ewe is held for the Lamb to suck her; and she is confined with it a day or two, by which time she generally adopts it. This custom is only in part advisable here; that is, whenever a Lamb dies, to accustomed its Dam, in this manner, to give its milk to another Lamb.

It has been feared by some that these Sheep, when no longer migratory, and changed from their accustomed climate, will degenerate, and their wool grow coarser; but experience does by no means warrant these apprehensions. They have been kept stationary for more than eighty years past in Sweden, and nearly as long in France, and yet have suffered no deterioration.

Mr. *Livingston* thinks the wool of his Merino Sheep, which he has raised here, finer than of those which were imported. It is a general rule with animals which shed their hair, that the farther north, the warmer, and of course the finer, is their coats; but, as these Sheep never shed their wool, the rule does not necessarily include them. Their wool is in this respect similar to human hair; but this is always found the finest in the colder climates.

Apprehensions have also been entertained that these Sheep, having in Spain been long accustomed to situations where Winter is scarcely felt, would be found unable to stand the severity of our Winters; but the fact just mentioned, of their being successfully reared even in the cold climate of Sweden, sufficiently obviates this objection.

Mr. *Livingston* says, that, 'like all other Sheep, they will be found the better for good keeping; yet they will not suffer more than others from neglect; and that they will, in every mixed flock, be found amongst the most thrifty in the severest weather.'

Some, again, may suppose that the Country will soon be stocked with Merinos, and that the price of their wool will then fall to that of common wool; but such should remember, that more than half the civilized world is destitute of these Sheep; and that, while they continue to remain so, the Sheep, the wool, or the fabrics made from it, will be eagerly sought after.

In the course of a century, North and South-America will probably contain two hundred millions of People, and the wants of these alone will at that time require three hundred millions of Merinos. There is certainly no danger of the price of Merino wool falling much, for twenty years to come.

The Ewes of this breed seldom produce twins; though, if necessary, they may be made, like other Sheep, to breed twice a year. Ewes of the English Teeswater breed have been known to bring five Lambs in a year.

The Ram, when put to the Ewes, should be better kept than usual; and for this purpose should be fed two or three times a day with a slice or two of bread, made of Indian meal, which may be given to him by hand. When the Ewes are not suckling Lambs, they may at any time be brought to take the Ram, by feeding some Indian corn to them.

The first Lamb of a young Ewe will never be so strong as those succeeding, because she will not have the same strength, nor the same quantity of milk, which she will have afterwards.

There are different breeds of Merinos in Spain, says Mr. *Livingston*, and the wool of some is inferior to that of others; some selling there for only sixty cents a pound, while others sell for a dollar. The best flocks are those of the *Escurial*, of *Gaudaloupe*, of *Paular*, of the *Duke D'Infantado*, of *Monturzo*, and of the *Nigretti*. The first exceeds for fineness of wool; the second, for fineness of form, and fineness and abundance of fleece; the third, with similar fleeces, are larger bodied. "The Lambs of this stock, and of that of the Duke D'Infantado, are commonly droped with a thick covering, which changes into very fine wool." The Nigretti are the largest breed.

After Merino wool has been sorted, as before directed, and is to be manufactured in the Family, let it be covered with soft water, mixed one-third with urine, and let it stand fifteen hours, or longer if the weather be cold. A cauldron is then to be put on the fire, with some soft water, and let two-thirds of that which covers the fleeces be added to it. When so hot as that the hand cannot bear it, take out the wool, put it in a basket, press out the liquor, put the basket in the cauldron, and there wash the wool by pressing, without any wringing of it, and then cleanse it in runing water. If the water in the cauldron become too dirty, take more water from that in which it was first soaked.

Dry the wool in the *shade*, not in the sun; let it then be beat with a rod, which takes out all seeds, &c. and softens it; then pick it, by opening it lengthways carefully, and card it with *cotton*, not with wool, cards. Carding machines are advised not be used for this wool, unless particularly fited for it.

The above is the European method of managing this wool, before carding, &c but Mr. *Livingston* thinks that if the wool be carefully picked and carded, so as to get out most of the dirt, and wove in this way, that it will answer without washing; in which case less oil, or grease, will be necessary.

Common wool canot be carded too much; Merino wool may. In spining, the warp must be twisted the opposite way from that of the woof, which should be spun more loose, or slackly twisted, than that of the warp. For spining the woof, the wool is to have one pound of oil, or grease, to every four pounds; but, for the warp, one pound of oil to every eight pounds of wool is the proper allowance. This is for very fine spining; but, for spining coarser yarn, less oil is necessary. Olive-oil is the best for greasing the wool; neatsfoot-oil is also very good; and no doubt the oil which is produced from the sunflower would be found as good as either.

See SUNFLOWER.

The Farmer will find a great addition to his profits from his Merino wool, by converting it into fine cloth, in his own Family, if this can conveniently be done.

Sheep of all kinds are subject to fewer diseases in this Country than in most others. This article shall, therefore, be concluded with noticing those most prevalent here, and the remedies for each, together with some slight notice of some which prevail abroad.

Those of grown Sheep are as follows:

The *scab* This appears first by the Sheep rubing the part affected, and pulling out the wool in that part with their teeth, or by loose locks of wool rising on their backs and shoulders.

The Sheep infected is first to be taken from the flock and put by itself; and then the part affected is to have the wool taken off, as far as the skin feels hard to the finger, and washed with soapsuds and rubed hard with a shoebrush, so as to cleanse and break the scab. Then anoint it with a decoction of tobacco-water, mixed with the third of lie of wood-ashes, as much grease as this lie will dissolve, a small quantity of tar, and about an eighth of the whole mass of the spirits of turpentine. This ointment is to be rubed on the part affected, and for some little distance round it, at three different times, with an interval of three days after each washing. With timely precautions this will always be found sufficient.

In very inveterate cases, Sir *Joseph Banks* says mercurial ointment must be resorted to; with great care, however, keeping the Sheep dry; the wool to be opened, and a streak to be made down the back, and thence down the ribs and thighs. Finewooled Sheep, and Rams which have been much exhausted by covering, are most subject to this disorder, and in finewooled flocks it is most difficult to cure. It is said that it may be communicated, even by a Sheep lying on the same ground on which a scabby one had shortly before lain, or by rubing against the same post.

Pelt-rot. In this disease the wool falls off, but the skin does not become sore, but is merely covered with a white crust. *Cure.* Full feeding, warm keeping, and anointing the hard part of the skin with tar, oil, and butter, mixed together.

Tick. As these occasion a constant scratching, they prove injurious to the wool, and they sometimes occasion the death of lean Sheep. *Cure.* Blow tobacco-smoke into every part of the fleece, by means of a bellows. The smoke is taken into the bellows, the wool is opened, the smoke is blown in, and the wool is then closed. This is repeated over every part of the body, at proper distances. It is quickly performed.

See also INSECTS, for another method of killing Ticks.

Dogs. These often prove more injurious to Sheep than all their other maladies put together. *Cure.* A fine, say of a hundred dollars, upon every Man that keeps a Female of these animals above eight inches high; or a yearly tax, say, of twenty dollars, laid upon the Owners. Extirpate the *Females* of this race, and the whole breed would soon disappear. The Legislature may easily enforce a law of this kind, without danger of its being *unpopular*, which it is said would be the fate of a law taxing the whole race of Dogs.

Staggers. A disease of the brain, which renders them unable to stand: Incurable by any means known, which would warrant the expense.

See, however, what *Gibson* says, of STAGGERS

Colds. The principal indication of this is the discharge of mucus from the nose. The cure has already been noticed. Whenever this, however, becomes habitual with old Sheep, they should be killed off

Purging. If any are severely afflicted in the Spring with this, which sometimes happens after being turned out to grass, house them, give them a dose of castor-oil, feed them with dry food, and give them some crusts of wheat bread. A slight purging will not hurt them.

Hove. Sheep, like Neat-cattle, when put into clover-pastures, sometimes have their stomachs distended by wind, so that they will die if not relieved. The swelling rises highest on the left side, and in this place let the knife be inserted, or other means used, in the manner directed for Neat-cattle.

See NEAT-CATTLE.

The diseases of Lambs are:

Pining. When the excrement of the Lamb becomes so glutinous as to fasten the tail to the vent, it must be washed clean, and have the buttocks and tail rubbed with dry clay, which will prevent any further adhesion.

Purging. Put the Lamb with its Dam into a dry place, and give her some oats, old Indian corn, or crusts of wheat bread. If the Dam has not milk enough, give the Lamb Cow's milk, boiled, or let it suck a Cow.

Sometimes it may be found necessary to bleed Sheep, to allay some inflammatory disorder.

'*Daubenton* recommends bleeding in the lower part of the cheek, at the spot where the root of the fourth tooth is placed, which is the thickest part of the cheek, and is marked on the external surface of the bone of the upper jaw, by a tubercle sufficiently prominent to be very sensible to the finger, when the skin of the cheek is touched. This tubercle is a certain index to the angular vein which is placed below.'

The method of bleeding, after finding the vein, it is hardly necessary to describe.

Philip De Castro, a Spanish Shepherd, has writen a short treatise on the diseases of Sheep in Spain, and of their management there; and he recommends that bleeding should be performed in a vein in the fore part of the dug. The essay of this Shepherd is believed to be worthy of some further notice.

He says the Merino Sheep of Spain are subject to the following diseases:

The *scab*. Cured by juniper-oil, when the weather is wet, or by a decoction of tobacco, in dry weather.

Basquilla; occasioned by too much blood. Cured by bleeding in the dug, as before mentioned.

Moderez (lethargy) occasioned by pustules formed on the brain. The Sheep keep turning, while feeding, to the side where the pustules are formed. Few recover, and the disease is infectious. Some get well in part by pricking the part affected with an awl; but those attacked with this disorder should be killed off.

Smallpox; being blisters, which first appear on the flanks, and spread over the body. It is produced by drinking stagnant waters. The diseased Sheep are to be kept apart from the rest, as the disease is infectious, and when the blisters break anoint them with sweetoil.

Lastly. *Lameness.* This appears to be the same as is described by Mr. *Livingston.*

He observes that 'the legs of Sheep are furnished with a duct which terminates in the fissure of the hoof; from which, when the animal is in health, there is secreted a white fluid; but when sickly these ducts are stoped by the hardness of the fluid.'

He adds, that he had, 'in some instances, found the Sheep relieved by pressing out the hardened matter with the finger from the orifice of the duct in each foot. Perhaps it may in some cases be proper to place their feet in *warm water*, or to use a *probe*, or *hard brush*, for cleansing this passage.'

He concludes by observing, that probably the ill-health of Sheep, in wet or muddy pastures, may in some measure be ascribed to the necessity of keeping these ducts free and open.

The Compilers of 'The Complete Grazier,' however, mention another kind of lameness in Sheep, which is called the *foot-halt*. It is caused by an insect resembling a worm, two or three inches long, which is found to have entered between the close of the claws of the Sheep, and worked its passage upward between the external membranes and the bone. To extract the worm, move the claws backwards and forwards in contrary directions, and it will work its way out. In Greatbritain, this disorder is chiefly confined to wet pastures.

De Castro also mentions diseases to which the Merino Lambs are subject, in Spain, when brought forth in wet weather; such as the *lohannillo* (gangrene) which has no cure. The *amarilla* (jaundice) which is infectious; the flesh and bones of the Lamb turning of the color of yellow wax: For this a small quantity of the flax-leaved daphne guidium is good. The *coviro*, a lameness of the feet, which appears to be the stopage of the excretory duct, before mentioned. Generally, he says, the Lambs are subject to the diseases of the Ewes; and that the same remedies are requisite.

Sheep, in Greatbritain, are subject to the *rot;* but it is believed that this disease has never been known in this Country. Another disease, however, which the British Writers mention, our Sheep are sometimes liable to; this is, being *maggoty*, occasioned by being flyblown; and, if not timely remedied, the maggots will eat into the entrails in twenty-four hours. Cured by corrosive sublimate and turpentine rubed into the sore.

Sheep, in Greatbritain, are also subject to diseases called the *redwater* and *whitewater*, from the color of their urine. No cure known. Supposed to be occasioned by eating poisonous weeds.

Frequently changing flocks of Sheep from one farm to another, where the pastures are equally good, is very beneficial to them. We know a flock which, for several years past, have been pastured on different farms, by being let out to different Farmers on shares, which are much the finest-looking Sheep to be found any where in the neighborhood where they belong.

The Farmer who would rejoice to see our Country so far independent, as to become stocked with woolen fabrics of our own making, must feel himself impeled by his patriotism to endeavor to afford his share of supplies of wool, which are so needful to our infant Manufactories; and he who is insensible to a love of Country, may still find a powerful incentive to the raising of Sheep, in consulting his own interest.

The raising of Merino Sheep, in particular, is undoubtedly very profitable; and the nearer the Farmer brings his breed to that of the fullblood, the greater will be his profit. Like every thing, however, which innovates upon ancient usages, the Merino has its prejudices to encounter; and the Savage who first introduced the use of the bow and arrow to his Countrymen, no doubt, had the same. But let the sensible and spirited Farmer persevere; and in the end his Merino flock will afford him a rich harvest; the pleasure and profit of which his weaker Neighbor must forego, as a tax on his prejudices.

Note. We have inserted the article SHEEP as it appeared in the first edition of this Work. We ought now to observe, that the extreme low price at which British woolen cloths are afforded, is calculated to discourage many in the rearing of Sheep extensively; and the Merino, from the great encouragement given to them in Greatbritain, has shared the common fate, in regard to the present low price of wool in this Country.

SILKWORMS. For raising these worms (says Mr. *De La Bigarre*) the first step is to procure the eggs, which should be from a climate similar to that where they are to be hatched. Good eggs take, successively, the colors of gridelin, purple, and an ash-colored hue: They will crack under your nail; while the bad ones will make no noise, when pressed in the same manner. Leave them on the cloth where they were laid by the female, and keep them in a dry place where they will not freeze in Winter, nor be too much heated in Spring.

When about to be hatched, take them off the cloth; and, when the first buds of the mulberry come out, proceed to hatching them. Divide them into ounces, and put each ounce into little flat boxes, lined and made soft in the inside, and let them be kept in a constant degree of warmth equal to ninety-six of *Fahrenheit*'s thermometer. Some put them into little bags, and carry them under their clothes in the day-time, and under their pillow while sleeping; but perhaps the better way is, to keep them in a small apartment constantly warmed by a stove or otherwise.

The bags must be opened every day to give them fresh air, while hatching. When the eggs turn a whitish color it is a sign the worms will soon come out; and then, if in bags, they must be stired up five or six times a day, to give the young embryos sufficient air; but, if they be in boxes, they can be thinly spread over the bottom, and then opening the boxes once or twice a day will answer. The time usually required for hatching is about eight or nine days; sometimes longer. If too much heat be applied in hatching, many of the worms will perish in raising. An ounce contains about forty-two thousand eggs; but among these may be many bad ones, which, if they do not hatch in two days after the first hatchings, may be thrown away.

The eggs of the yellow cocoons are to be prefered, as they give the most and best silk.

If you hatch in bags, as soon as you find some of the worms coming out, put them all into such boxes as before

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But times must alter. The wool of the Merino Sheep which are reared in Greatbritain is found to be growing coarser, and in a few years will be unfit for making the finest cloths. The climate and most of the soil of that Country is only properly fited for producing large, coarse, longwooled Sheep.

Here, the quality of the Merino wool is found to be rather improved. The British will therefore be soon compeled, in a great measure, to abandon their own stock of Merino Sheep, and to look abroad for supplies of the finest wool. It is also to be expected that further encouragement will be given to our own Manufactures, as this is a policy that must be pursued, if we ever expect to become a great and independent People.

described. When a sufficient number have come out, take a piece of parchment fited to the inside, cut it full of holes like a sieve, lay it over them, and on it spread some tender young mulberry leaves, and the worms will then come up through the holes to feed on them. When a sufficient number have thus come up, take up the parchment, by strings fixed to it for the purpose, and place the leaves and worms in a larger box or shelf, lined with white paper. Fill only about a third of the bottom of this box, or enclosed shelf, with leaves; because as the worms grow larger they require more room. Here you feed the worms till after their first moulting.

In the mean time, the parchment is to be laid on with leaves, as before, to take out other supplies of worms; and if these be taken out on another day they are to be put in another box or shelf; as those hatched on different days are to be kept in different boxes. At the end of two or three days, all the good eggs will be hatched, and the rest may be thrown away. After they are hatched, they must be kept in about the same temperature of heat for ten or twelve days. They are to be fed twice or three times a day with tender leaves, till the time of the first moulting; and let those leaves previously fed be eaten, before fresh ones are given.

In about six or seven days they generally arrive to their first moulting, if properly kept in regard to warmth, cleanliness, &c. If they should be as long as a fortnight before moulting, they will not do well.

In their moultings, they lie in a torpid state, in which they leave their old coats and acquire new ones. They moult four times, before they begin to spin. While in this state, they should be kept rather warmer than usual, and should not be disturbed. Previous to each of these times they look dull and weak, they lose their appetite, the skin becomes bright, and they seek for a place to lie by themselves. They lie motionless for about two days. They will not all moult on the same days; but in three or four days the business will be over, which may be discovered by the color of the skin, and by their activity; and then it is time to change their litter and clean the shelf. In order to get them out, spread over them some fresh leaves, upon which they will crawl, so as to enable you to lift them up. Put one-half of these into one shelf of the same size, and the other half into another; and this enlargement of their room must be repeated after every moulting, as they are constantly growing larger.

After the first moulting, some of the worms will be redish, some ash-colored, and some of a blackish hue. The redish ones may be thrown away, as they will not come to any thing. More worms perish in the third moulting than in any other.

The mulberry leaves must be picked when perfectly dry; and as this cannot be done every day, a store of them is to be kept on hand, laid in a cool dry room, and stired up now and then, to prevent their heating and wilting. The number of meals, after the first moulting, is to be governed by the appetite of the worms; and, if this be not good, it is most probable that they want more heat. Do not deal out the leaves faster than they are eaten.

In seven, eight, or nine days, they will moult a second time; and so on, for the two following times. The larger they grow, the less heat they want. After the third moulting, open the windows each day, to give them fresh air. The shelves are to be cleaned after each moulting; and where the intervals between the moultings are unusually long, let them be cleaned twice. When too much crowded, take some out on leaves, as before directed, and place them elsewhere. They cannot bear to be touched by hand, unless very gently.

The white-mulberry leaves are best for feeding the worms; and the tender young leaves of young trees are to be prefered at first; but in their more advanced stages they want older leaves; and these may be of older, or grafted, trees. Other kinds of mulberry, however, will answer. If the leaves cannot be had dry, let them be dried before they are used, as wet leaves are hurtful.

When they are past the last moulting they eat greedily, and want more food than before. At the end of seven or eight days they begin their cocoons. During all this time, let them daily have fresh air, and let their shelves be cleaned.

When you find them creeping about without eating, as if in search of something, with their bodies of a bright straw-color, it is then time to prepare bushes, fixed on tables, for them to climb on and fix their cocoons. The bushes are to be dry and clear of leaves, and set in rows with their tops leaning together. Under these lay some mulberry leaves, for the further feeding of those which may not be quite ready for spining, and do not let the worms be crowded too much on the tables. To put them on the tables, you apply your finger, to which they readily attach; then put them on a smooth varnished plate, to which they cannot adhere, and empty them carefully on the table. Those that incline to feed longer will do so, and those that do not will ascend the boughs. The spining is completed in three or four days; but, as they do not all commence at the same time, pick off the cocoons in about twelve days after they have begun to spin.

The chrysalis contained in each cocoon is killed by placing them, in baskets lined with brown paper, in an oven heated nearly warm enough to bake bread. If this be not done, the chrysalis eats its way out of the cocoon, and thus spoils the contexture of the silk. They are to be kept in the oven till the ratling noise, which they occasion while dying, has abated. Then take them out, and wrap them close in a blanket to suffocate those which may not yet be dead. Previous to the operation of baking, the outer coat, called tow, is to be taken off; and the same is to be observed with those which are kept for seed.

In reserving these, take equal numbers of males and females, of the yellow kind. The male cocoon is sharp-pointed; the female, round at each end. After being divested of their tow, string them together, male and female alternately, upon a coarse thread, leting the needle go merely through the surface of each, for fear of hurting the chrysalis within; hang these in a dry place till the butterfly comes out. One pound of cocoons will give an ounce of eggs. When the butterfly has come out, the males are known by being sharp-pointed; the females being larger and full of eggs. Place them all on a piece of black cloth, and put the males and females together in pairs; let them remain so three or four hours; and then throw the males away, leaving the females to deposit their eggs. These are to be well dried on the cloth on which they are laid, and put in a fresh room during Summer, and out of the way of frost during Winter.

Bad management and other causes occasion some disorders among the worms. Some become fat, and do not moult, but continue eating; having a whiter and more oily appearance than the rest. After the third or fourth moulting, some become lean, refuse to eat, turn soft, and become smaller than formerly. The yellow worms never appear but a little before spining, and, instead of becoming mature, swell up with nasty yellow spots on their heads, and at last over their bodies. All these, when discovered, are to be thrown away.

The other method, recommended by the same Writer, is to raise these worms on white-mulberry hedges. A hedge of this kind, of three years old, he says, begins to be fit for the worms; but those which are four or five years old will be better, as they afford the worm more places of retreat in storms. Two or three days after the first moulting, and in a fine warm day, put the young worms on the hedge, by means of leaves as before mentioned. The feathered end of a goose-quill is very good to raise them, or move them in different places. Put them on the hedge at the rate of about one hundred to every two rods; but thicker, where the hedge is older. Worms thus raised in the open air, says the same Writer, are free from all disorders; their only fate depends on the season; and our Summers are preferable to those in Europe, for raising them. In this way, care must, however, be taken to keep certain birds from them.

The same Writer also remarks, in a note to his observations on the diseases of this worm, that he was afterwards informed of an experiment made in this State, by which it appears that this climate is more favorable for raising them under cover, than that of Spain or France. Out of six thousand worms raised by Mrs. *Montgomery*, but very few died; and her success in raising them was equal in preceding years. In Europe, he says, four-fifths of them perish before spining.

Having thus described the process of forming the cocoons or balls of silk, something remains to be said of the manner of converting them into threads, for making cloths.

The cocoons are covered with a kind of rough cotton-like substance, which is called floss: Within, the thread is more distinct and even; and next to the body of the insect the apartment seems lined with a substance of the hardness of paper; but of a much stronger consistence.

The threads composing the cocoons do not go round, in the manner in which a ball of thread is wound; but lie in an irregular manner, winding off first on one of the sides, and then perhaps on that opposite. The whole length of a thread is about three hundred yards Eight or ten of the cocoons are usually wound off together; though the number to be thus wound off must depend on the size intended to be given to the thread composed of these, when twisted together.

In order to commence the operation of winding, the floss is first to be taken off; and then the cocoons are to be thrown into warm water, and stired about in it till the end of the thread of each is discovered by its becoming disengaged from the body of the cocoon.

The proper number of threads are then to be wound off together, the cocoons remaining in the water during the operation. The whole of each is not, however, to be wound; as the latter parts of the threads gradually grow weaker, and of a bad color.

The paper-like substance, before mentioned, may be used in two ways: It may be stained of various colors, and used for the purpose of making artificial flowers; or it may lie in the water till the glutinous matter that cements it is dissolved, and then be carded, and spun, for making silks of inferior quality.

SLIPS. These are twigs torn from a tree or shrub, to propagate by planting in a moist soil. Let two-thirds of their length be buried, and they will strike root more readily than cutings. This, says Mr. *Deane*, should be done as soon as the ground is thawed in the Spring. They should be set, if possible, as soon as they are taken from the tree; otherwise let their ends be enclosed in wet clay, until the time of seting.

They should be set in fine rich pulverized earth, and should be frequently watered, particularly when the ground is dry.

Some twigs will in this way grow very readily; others, again, are more difficult to grow. Mr. *Deane* advises to place those, most difficult to grow, in pots, where they can be more carefully attended to. It is said that some trees, which are not natural to be cultivated in this manner, will not grow so large as when raised from the seed.

Where fruit-trees are cultivated in this way, the trees thus raised will bear the same fruit as those whence the slips where extracted. It is said that the life of a fruit-tree, raised from a slip or cuting, will end nearly at the same time of that whence the slip or cuting is extracted; but this seems very doubtful, and in most instances unworthy of belief.

SMUT. The cause of smut in wheat has been productive of much investigation and speculation; but, since the means have been discovered of *preventing* it, we may well rest satisfied with this.

Mr. *Young* sowed fourteen beds with the same wheat-seed, as black with smut, he says, as he ever saw any. The first bed was sown with this wheat without washing, and this had three hundred and seventy-seven smutty ears; that washed in clean water, three hundred and twenty-five; that in limewater, forty-three; that in lie of wood-ashes, thirty-one; that in arsenic, twenty-eight. Again. That steeped in limewater four hours, had twelve; that in lie four hours, twelve; that in arsenic four hours, one. And again. That which was steeped in lie, as before mentioned, twelve hours, had none; and that which was steeped in the same kind of lie twenty-four hours, had none: That also which was steeped twenty-four hours in limewater, had none; that steeped in arsenic twenty-four hours, had five.

Mr. *Ecroyd*, of Philadelphia county, says that in England he saw this experiment fairly tried: Grains of smut were pulverised, and applied to wheat which was perfectly clean and clear of smut, and which was then sown, and it produced smutty wheat. At the same time, dirty smutty wheat was *effectually* washed in clear spring-water, and sown, and was entirely free from smut.

In order that the wheat be effectually washed, it should be put into two or three changes of such water, and well rubed and stired about, so as to cleanse the grain *entirely* from the smut. Mr. *Ecroyd* says the Man who made these trials had a premium given him, by a number of Farmers, for the discovery; and that, in the way just mentioned, he would produce smutty wheat from seed originally clean, and clean wheat from seed originally smutty, in drills, sown alternately in the same field.

It has been observed that seed-wheat, which has been well ripened before harvesting, is much less liable to smut than that which has been cut early. Let the wheat for seed be the last harvested, and let it be kept by itself, perfectly dry, until it is threshed out. Perhaps the better way would be, to thresh it out in the field when in a very dry state. The reason assigned for this is, that smut is believed to be somewhat infectious; and that therefore if wheat, entirely free of this disorder, be put in a mow with smutty wheat, the whole mass will become more or less infected with smut, by reason of the sweating or heating of the mow.

Wheat that is very smutty in the field should not be harvested, until the crop is so fully ripe and dry that it will shell out considerably in harvesting; by this mean the grains of smut are mostly broken and dissipated by the harvesting and threshing. Threshing in the field would no doubt, in this case, be preferable; as the drier the crop is, when threshed, the more readily would the smut-grains be broken.

SNOW. In the northern States, snow is very useful in protecting Winter-grain and grass from the severity of the frost. Winter-grain or grasses, which have been covered through the frosty season, will grow much more rapidly in the Spring than those which have lain bare. Snow may, however, fall too soon, and lie too long, for Winter-grain, as in that case it is apt to be smothered.

Snow is useful in preserving all fresh meat, during the cold season. Let the meat be first a little frozen on the outside, then put it, on a cold day, into casks filled with snow, laying the snow between the pieces, so that they will not touch each other, nor the sides of the cask. The whole is to be constantly kept liable to the action of the frost; and in this way the meat will neither grow dry, nor lose it color, during the frosty season.

SOILING OF CATTLE: Feeding cattle in stalls, during the growing season, with grass cut and carried in to them. It is particularly recommended for Milch-cows, Working-horses, and Oxen, and for fating cattle; and Mr. *Young* also recommends that Swine be soiled in a yard for the purpose.

The advantages of this method of husbandry have been experienced in Europe; and it is strongly recommended by Mr. *Young*, by the Compilers of 'The Complete Grazier,' and by other eminent Farmers of Greatbritain. A communication of Dr. *Thaer*, Physician of the Electoral Court of Hanover, to the English Board of Agriculture, as to the result of the experience of the Baron *de Bulow* and others, lays down the following as facts which, he says, are incontrovertible:

1. A spot of ground which, when pastured, will yield only sufficient food for *one* head, will abundantly maintain *four*, when kept in the stable.
2. Soiling affords at least double the quantity of manure from the same number of cattle; for the best Summer-manure is produced in the stable, and carried to the fields at the most proper period of its fermentation; whereas, when spread on the meadow, and exhausted by the air and sun, its power is much wasted.
3. Cows which are accustomed to soiling will yield much more milk, when kept in this manner; and fating cattle will increase much faster in weight.
4. They are less subject to accidents and diseases; they are protected from the flies which torment them in the fields during warm weather; and they do not suffer from the heat of Summer.

There are other advantages attending this method of husbandry. The trouble of driving the Milch-cows to and from the pastures, three times a day, is saved; the Working-horses and Oxen are always at hand, so that no time is lost in going after them; and, what is of no small importance, when the cattle are housed the growing crops are in more safety.

For the most profitable cultivation of the earth, it is requisite that it should be in the highest state of fertility. Some manures will enrich a soil to a certain extent; while others will make it still richer. Generally speaking, barndung is the only manure, accessible by every Farmer, with which grounds may be fertilized in the highest degree. But how is a sufficiency of this to be had?

If all vegetables were buried, while green, in the soil where they grew, the manure thus afforded by them, together with what additions the soil receives from the air by the requisite ploughings, would be constantly increasing its fertility. The vegetable mass produced on a farm is indeed left on, but with much waste, not only in the drying of the vegetables before they are put into the barn, but in the drying and washing of the dung, and the evaporation of its best parts, when left in the barn-yard, before it is mixed with the soil; and by the still greater waste, when droped in the fields.

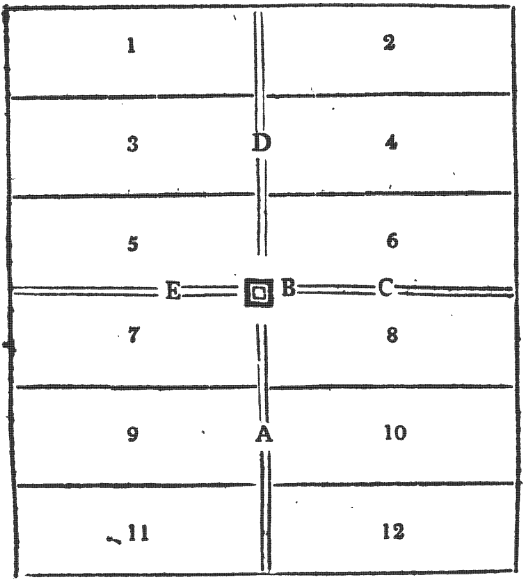
The essential point, then, is to make and save the greatest possible quantity of barn-dung manure from a given quantity of ground; and this is only to be accomplished by soiling.

For this purpose, therefore, some of the most intelligent European Farmers have barns with cellars under them, for the purpose of receiving the dung of the cattle, and into these the dung and litter are constantly thrown, where they are prepared, by a due state of fermentation, for mixing with the soil. Suitable earths are also laid behind the cattle to absorb their stale as it runs backward, and these, when saturated, are also thrown down and mixed with the dung. Some, however, object to cellars as the receptacles of the dung, on the ground of their being too cool for the process of its fermentation during Summer, and prefer sheds adjoining the barn, to keep the dung under cover to protect it from the rains. Where cellars are used, they should not be too deep, and should be well-opened for the admission of warm air during Summer.

The quality of the dung of cattle depends much on their food; that therefore which is made from green grass will be found superior to that made from dry hay; that which is made from fating cattle is the best of any.

Having observed thus much, we will proceed to lay down a system of field-husbandry, in connection with the plan of soiling cattle, which we presume will be found far more profitable than the usual method of field-culture.

Take a field of proper extent, say, for instance, forty acres, as nearly square as may be, and of as nearly uniform soil as can be had, of a good gravelly-loam, sandy, sandy-loam, or other good arable soil, and sufficiently level. Clear it of stones, so as that it can be tilled in the most complete manner: Build a barn in the centre of this field, with a walled cellar under it, with a door to drive in with a cart on one side, and another to drive out at the opposite side. The barn is to be proportioned to the size of the field, and a communication to be made to it on the side most convenient, by a lane. For a more minute description, a plan of the whole is here laid down.



A. The lane to the barn.

B. The barn with a fence round it, communicating with the lane.

C. D. E. Divisions of the field into four equal parts, where strips of land are left unploughed wide enough for a cart to go upon.

1. 2. 3. &c. Subdivisions of the field, on which are cultivated crops of roots, grain, and grass, in rotation.

In this barn stables are to be fixed for keeping a number of Milch-cows, Working-horses and Oxen, or fating cattle, proportionate to the size and products of the field. They are to be kept on grass, cut and carried in to them during the growing season, and on hay and other food during Winter. The Cows should be let out each day during the three milking times, and all the cattle should have a constant supply of water from a well made near the barn for the purpose. During Summer, the water may be carried to the cattle in troughs in the stable, but in colder weather the cattle must be let out to troughs of water in the yard. As lucerne starts early in the Spring, and grows late in the Fall, it will probably be found one of the best grasses for early and late feeding. Perhaps some other grasses may be found best in particular soils, and for particular purposes.

See Grasses.

The common trefoil or red-clover (*see* CLOVER) which is mostly cultivated in this Country, is very good for soiling. The morning's supply of grass should be brought in the afternoon, and that for the afternoon, in the morning; though, if it be a fact that dew is nourishing to cattle, it would seem the better way to bring in the whole supply for the day in the morning. A light hand-cart is to be used for bringing in the grass from the parts of the field nearest the barn.

After such a field has been brought under complete cultivation, and enriched by this mode of culture, it will probably keep, Winter and Summer, about twenty-five head of Cows, and fating or working cattle. The lucerne may be made to yield sufficient for soiling about six head per acre, or six or seven tons of hay per acre, if used for that purpose. The common red-clover may be made to yield upwards of four tons of hay, per acre, at two mowings, and is excelent as a lay for other crops. About four hundred loads of the best barn-dung would probably be afforded yearly from such a field, which would be at the rate of ten loads per acre each year.

The extra labor required for cuting and carrying in the grass, and cleaning the stalls of the cattle twice a day, during Summer, would probably employ one Hand two-thirds of his time. In return for this, the Farmer saves the rent of at least twelve acres of the best pasture-land, which may be put at five dollars an acre, and his Cows give more milk, and his fating and working cattle keep better and thrive faster. Here, then, the Farmer is amply repaid for his extra labor. But the great superiority of the soiling-system lies in this; by the great quantity of excelent manure, thus afforded, the Farmer is enabled to carry on a system of field-culture that will be found to average one-half more of clear profit, than can be expected in the usual mode.

It will be seen, by the drawing of the field, that it is to be divided into twelve parts, and that the divisions are long and narrow: This renders them more convenient for ploughing.

It has been observed, however, that those Cows which have been always used to be kept by soiling, during the growing season, are usually more profitable than those which have been newly put to this method of keeping.

See APPENDIX, which contains the best system of rotation of crops.

SOOT. Forty bushels of this to an acre, is a good top-dressing for almost every kind of Summer-crop, or for Winter-crops, when sowed on them in the Spring. Let it be powdered fine before it is applied. It is also very good for cold grass-lands.

It is recommended to be sown over turnips, not only for the purpose of manuring the ground, but for keeping off insects. For this purpose, let it be finely pulverized and sown in the morning while the dew is on, and let it be in moderate quantity, lest it should injure the young plants, to which it will adhere and repel the insects.

See MANURES.

SOWING. There are three methods of commiting seeds to the ground.

1. *In hills, which is usually called planting.*
2. *In drills, or continued rows.*
3. *In the broadcast method, or a cast of the hand.*

For making seeds vegetate more readily, *see* SEEDS.

By the drill-method of sowing, nearly one-half of the seed requisite for sowing may be saved; which, with regard to wheat, particularly, is a matter of some consequence.

See DRILL.

For the proper time of commiting each kind of seed to the ground, and the quantity to be sown of each, *see* the articles of which the seeds are to be sowed.

A general rule which prevails, in regard to sowing seeds, is, that the largest and most full-grown be sown. It is said that small seeds produce small stalks and small seeds, and large seeds the contrary. This, it is believed, is a matter well worth attending to, particularly as it respects the different kinds of grain which are not wholly naturalized to our climate or to our soil.

Sowing too early in the Spring may be as injurious as sowing too late; for, if the ground be not well pulverized, and sufficiently warmed, before sowing, the seeds will come up slowly, and be stunted in their growth.

M. *Duhamel* found, by experiments, that few seeds will come up, if buried more than nine inches in the soil; that some will rise very well at the depth of six inches; and, that others again will not rise if buried two inches. Those seeds which, in vegetating, are thrown out of the ground, such as beans, &c. ought to be buried lightly; and, in general, it may be observed, that very few seeds require to be deeply buried. In light soils, they should be buried deeper than in stiff and cold ones. When the ground is rolled, after sowing, seeds will come up with a lighter covering of earth, than where this is not done.

Much depends on having the seeds sowed as evenly as possible; and for this purpose they ought to be sowed when the weather is not windy, particularly those which are light or easily wafted away. In sowing some seeds, it is advisable to go over the ground twice; sowing one-half of the intended allowance of seed one way, and the other half crosswise.

Previous to sowing, seeds should be soaked in some fertilizing liquor; and for this purpose a solution of saltpetre with lie of wood-ashes and old urine is believed to be best; but, in such case, let the seeds be sowed *immediately*, or they will not readily vegetate. Mr. *Johnson* found his crops of wheat and Indian corn greatly benefited by soaking the seeds in a solution of saltpetre and lie of wood-ashes alone. Let the seeds be soaked about twelve hours in most cases; but, for preventing smut in wheat, about twenty-four hours are necessary.

See SMUT.

Let the seeds be dried, before sowing, with a sprinkling of gypsum; or lime, or wood-ashes, may be used, when gypsum is not to be had.

Grain that is designed for sowing should always be kept well aired; for, if deprived of this for a considerable length of time, it will not vegetate. Mr. *Miller* took fresh seeds of different kinds: A part of each he put into vials, and sealed them so as to exclude the air; and the rest he kept exposed to it. After a twelvemonth, he sowed each on different parts of the same bed; when all those came up that were exposed to the air, but none of those which were excluded from it.

Where land is very rich, it ought generally to have more seed than if it be poor; and if the size of the grains be large, the quantity sown should be greater than where they are small.

SPAVIN. A swelling about the joints of Horses, causing lameness. There are two kinds of this disorder; a blood-spavin and a bag-spavin. The former is a swelling of the vein that runs along the inside of the middle joint of the hind legs, which is frequently attended with a lameness of the joint.

To cure it, says Mr. *Gibson*, first apply restringents, and a bandage tightly drawn round the joint; for these, if early applied, will generally effect a cure; but, if by these means the vein is not reduced to its usual dimensions, the skin should be opened, and the vein tied with a crooked needle and wax-thread, passed underneath, above and below the swelling, and the turgid part will then digest away with the ligatures. Let the wound be daily dressed with a mixture of turpentine, honey, and spirit of wine.

The bag-spavin is merely a cyst, or bag, filled with the gelatinous matter of the joint, irrupted from its proper place. To cure this, cut into the bag, and let the matter discharge; then dress the sore with lint diped in oil of turpentine, puting into it, once in three or four days, a powder made of calcined vitriol, alum, and bole. By this method of dressing, the bag will come away, and a cure will be effected without any visible scar.

Should this fail of a cure, the hot iron is directed to be applied; and in that case, if the joint become inflamed, apply a poultice over the dressings, till the swelling be reduced.

SPAYING. It is recommended to spay Sows, as this prevents conception, and will cause them to have more fat than the barrows. Heifers are also spayed in Greatbritain, where they are raised merely for fating. The method of performing this, with effect, is best learned by practice.

SPELT (*Triticum Spelta.*) This grain is much used for bread, in Germany, and is the frumentacious tribute which the ancient Romans exacted from the People of that Country, while it formed a part of the Roman Empire. It is considerably cultivated by the German Farmers in Pennsylvania. Its product is about the same as that of wheat; but the flour made from it is of a yellower color; and therefore not so valuable in the markets, though perhaps equally good for common family-use. The grain is to be hulled before grinding; and, as the skin of it is very thin, it is very productive in flour.

Its advantages over wheat are, that it is much less liable to be Winter-killed in moist lands, where wheat is apt to be drawn up by the roots by the frost. It will grow on the richest soils, without lodging; and it will also grow well on soils too poor, or dry, to bear wheat to any advantage. It is usually sown in Pennsylvania about the 20th of September; though it is said that it may be cultivated as a Spring-crop. Dry soils are said to be most suitable for this grain. Probably it might be cultivated to advantage in Newengland, and elsewhere, where wheat does not flourish.

SPIKY-ROLLER. This instrument is much recommended, by some English Writers, for mellowing clay-ground that is baked in clods. It is also recommended to be passed over fields of wheat, in the Spring, for the purpose of loosening the ground; and then to be followed by a brush-harrowing. This would, no doubt, be very useful; and would afford a fine opportunity for sowing cloverseed on the crop. Its further use is, to tear and loosen old grass-bound meadows, for the purpose of making the grass grow more thriftily.

It is merely a wooden roller with iron teeth, or spikes, drove into it. They are to be about seven inches long, and drove three inches into the wood, and set four inches apart, in diagonal rows round the roller. The outer ends are not to be sharp but square.

SPROUTS. Where woods are cut off which are apt to sprout, the best way is to persevere in destroying the sprouts as fast as they appear; because the longer they are suffered to grow, the more difficult it becomes to extirpate them, particularly in wet meadow-lands. In these, the difficulty is increased on account of their taste being less palatable than those of uplands; and therefore cattle are less inclined to eat them. In such grounds, the best way is to cut off the sprouts four or five times in the first season, and this will pretty much destroy them. If a swamp can be flooded two or three years, it will effectually destroy sprouts and every other growth; or if it can be drained dry, it so alters the nature of the soil, that its growth of wood soon inclines to die, for want of its usual moisture.

The best method of destroying sprouts, is to beat them off from the stumps. This can be done with the pole of an axe; and the more a stump is battered, and its bark beat off round the roots, the more effectually will the further growth of sprouts be prevented.

Elder bushes may be completely destroyed, by cuting off the sprouts five times in any one year.

See further, WEEDS.

SPUR. A disease in rye. The grains which are affected with it are larger than the rest, mostly crooked, bitter to the taste, projecting beyond their husks, dark-colored, rough, and deeply furrowed from end to end.

This kind of diseased grain sometimes proves very destructive to those who eat it.

See RYE.

STABLE AND STALLS. The stable should be so well enclosed as to defend the beasts from the winds and storms; and at the same time it should not be too warm, lest it make them tender, when exposed to the weather.

The stable should have a good floor, descending a little backwards, so that the stale will run off behind. It should be divided into separate apartments, or stalls, for each beast to stand by itself. There should be a good manger for Horses, and the rack which holds their hay should be upright and not too high. Some prefer puting the hay into a very large manger, or trough, made for the purpose; and what is left by Horses can be given to other cattle, as they will eat it very readily.

Stables should be kept clean and well littered, to keep the beasts comfortable when they lie down. Some advise boring holes through the floor, to let off the stale more readily. For Horses, there should be sufficient room in the stalls to turn their heads to every part of their bodies, and to raise them as high as they please.

STAGGERS. A disease in some kinds of cattle. If the staggering of a Horse be owing to hard usage, *Gibson* directs to take a pint of blood from his neck, and then a quart from some vein in his hinder parts, and that he be then kept on moderate cleansing diet.

When the disease arises from an apoplectic disorder, he must be treated as before, and exercised every day with chewing assafœtida, savin, and all other noisome things, which will keep him in constant action, and forward the circulation of the blood in the small vessels. Afterwards, recourse must be had to clysters, strong purgatives, rubing, and exercise.

When it arises from a swiming of the head, the animal reels, turns round, and falls. For this, take an ounce of senna, boiled in five pints of water, with four ounces of common treacle, and the usual quantity of oils or lard, to throw in as a clyster; and repeat this for two or three days. After this he may have a drench of beer, in which the roots of poeny, angelica, rue, rosemary, and flowers of lavender have been steeped. If the disease continue obstinate, balls of cinnibar, and assafœtida, with bayberries, will be proper here, as in apoplectic cases.

Mr. *Gibson* condemns the practice of puting ginger and other stimulating things into the ear, as dangerous, though it may sometimes prove beneficial.

STEAMBOILER. This is an implement that no Farmer or Planter should be without, as potatoes, particularly, are nearly doubled in value, for feeding and fating, when boiled. Turnips and other roots, and pumpkins, are also much improved, as food for cattle, by a similar process.

Boiled clover-hay is found very good for keeping Swine, during Winter; and we are of opinion, that if fed to Milch-cows, during that season, it would greatly improve the quantity of their milk, and keep them in better order, than when fed dry to them. We believe this to be well worthy of a fair experiment, by having a vat, or box, to hold the hay, sufficiently large for the purpose.

A steamboiler is commonly made by seting a kettle, holding twelve gallons or more, in a furnace, of brick or stone, and over this a hogshead, with one head taken out, and the other bored full of holes, is set so close that the steam of the kettle, when boiling, can only rise through the holes, and thence ascend among the articles to be boiled in the hogshead, and pass off at the top. In this way a hogshead full of potatoes will be nearly as soon boiled, as a small part of them only could have been, if placed in the kettle underneath.

As the kettle must be so closed as to prevent any steam passing off, but through the bottom of the hogshead or vat, a pipe or tube must be set in one side, through which, with the aid of a funnel, the water is to be poured into the kettle, as often as occasion may require. When poured in, the tube is to be stoped, with a plug for the purpose.

Grain of all kinds may be steamboiled to great advantage, for feeding and fating cattle; but, in that case, it is requisite to have the bottom of the hogshead covered with a cloth, to prevent the grain runing down through the holes.

By experiments which have been accurately made, in Pennsylvania, upon Indian corn and potatoes, used for fating Swine, it was found that they increased in weight one-third faster on the boiled, than on the unboiled food; or, in other words, they gained three pounds when fed on the former, where they only gained two pounds when fed on the latter. We are fully of opinion, that steamboiling food, for feeding or fating all sorts of cattle, generally increases the value of the food, as much as forty or fifty per cent.

We are induced to lay this down, as a general rule, that all kinds of food, whether for Man, or beast, is more or less improved in its nutrimental qualities, by being boiled. This is evidently the case, in regard either to grain, or roots; and we believe that every kind of vegetable matter, even green grass itself, will be found much improved, as a food for cattle, when it has been sufficiently subjected to the operation of the steamboiler. But, whether the additional expense thus incured would, in all cases, be found overbalanced by the additional value thus given to the food, must depend on the results of experiments to be fairly and properly made.

STERCORARY. This is constructed for the purpose of preparing barn-dung for use, by roting and fermenting. It is simply a shed, of suitable height and dimensions, with a floor, or bottom, made for the purpose of saving all the liquor of the dung; for this liquid is found to be very valuable, as a manure. The floor of a cider press is sufficient to give an adequate idea of the proper manner of forming a floor for a stercorary. It is to have a gutter to catch the liquor, and a cistern to contain it; and, when thus collected, is either to be thrown back on the heap of dung, or used in composts, or otherwise, as may be found most expedient. This liquor, if not thus preserved, by the floor of the stercorary, soaks away into the ground on which the heap of dung is laid, and is almost entirely lost.

The shed is for keeping off the rains, which by constantly falling on, and soaking away through the dung, carry much of its richest parts into the ground below. The shed may be of cheap construction. The roof may be of boards, or of slight thatch-work, as it is not essential that it should be wholly impervious to the rains.

The floor should be made so solid and compact, that little or no water could pass through it. It should be a little rising from the gutter, on every side, to the middle. One made of pounded clay, of suitable thickness, and then closely paved on the top with stones is perhaps as good and as durable as any. It should be paved, to enable carts to go upon it for unloading the dung, when it is to be laid there for preparing; as well as for carrying it away, when prepared.

The dung should be laid in the stercorary to the height of, say, five feet. It should be laid lightly, without any further compression than that of its own weight. If it be stired up from the bottom, once at least, the process of its preparation will be proportionately accelerated. The stercorary may also be found very useful in preparing composts, where barn-dung is an ingredient.

See further, MANURES.

It is believed that for all crops which are most assisted by roten barn-dung, or by composts, in which barn-dung forms a very considerable proportion, a great saving may be made by roting and fermenting the manure in a stercorary. One of the dimensions of eighteen feet by forty-five would probably be found sufficient for preparing one hundred and fifty tons of manure at a time; and the expense of such a building need not exceed one hundred dollars.

From the best information we have been able to obtain, we are induced to believe that barn-dung, in particular, when prepared in a stercorary, will be found worth one-fourth more, than if merely roted in a heap, uncovered, on the bare ground. It should also be remembered, that the stercorary may be so constructed, and situated, as to be used for a sheep-pen, during Winter.

STOCK. When an English Farmer speaks of *stocking* a farm, he means the requisite number of ploughs, harrows, carts, and other implements of husbandry, beside cattle of different kinds, for carrying on the business of husbandry on that farm to advantage; in the same way that a Merchant or Manufacturer speaks of the stock, or capital, which is requisite to carry on any branch of trade or manufacture.

But Farmers in this Country, being but little used to renting farms, do but seldom enter into calculations of this kind; and by this mean the word *stock* has here acquired a different meaning, in regard to farming-business; it means merely the number of cattle of different kinds which a Farmer keeps on his farm. It would, nevertheless, be well for those who are obliged to rent farms, in this Country, to examine first whether they can acquire the requisite *stock* for any farm, agreeably to the English meaning, before they attempt to hire; as by not having this they often injure themselves, as well as their Landlords.

Young stock are always more profitable than old; as these, when turned off to fat, do not answer so well as those which are but little past their prime. It costs more to faten old cattle, and their meat is not so valuable.

Stock should be suitable to the soil on which they are fed. If their pastures be chiefly dry hills, Sheep is the best. If they be grounds fit for the cultivation of clover, and various other grasses, the dairy, or fating of cattle, may be best. And if they be wet grounds, which only produce coarse grasses, the raising of Horses will be found most profitable.

The profit of raising Horses depends much on the Breeding-mares, and also on the price which can be obtained for Horses. Generally speaking, the Farmer will do better in turning his attention to the best breeds of Sheep, if his pasture-lands be suitable. The dairy is also profitable, where properly managed with regard to the milk; and also with regard to raising a due proportion of Swine, with the aid of clover, and the skim-milk, whey, and buttermilk together.

See DAIRY and SWINE.

But as stocks of cattle are found to degenerate, unless pains be taken to prevent it, an essential point of husbandry lies in taking the proper steps for improving the breeds. Some Cows will give double the quantity of milk which others give, and of better quality. Some Bulls beget much finer and larger Calves than others. Some Sheep bear more wool, and of better quality, than others; and some Rams beget Lambs possessing these qualities in a superior degree to others. Similar observations may be made of some breeds of Horses and of Swine. The essential point, therefore, is, for the Farmer to be diligent in selecting those breeds which are found to be most valuable, as well from those raised in his own stock, as from those which may be obtained elsewhere. Let him persevere in constantly selecting the best breeds for a stock, rejecting all others, and he will presently find his stock very greatly improved.

In Greatbritain, much pains are taken to improve the breeds of cattle, and the success attending such exertions are very encouraging. In some of their agricultural publications, mention is made of prodigious prices being given for certain animals of superior breed; such as a Bull, of Mr. *Paget*, having been sold in the year 1793 for four hundred guineas; Heifers belonging to him, for eighty-four guineas a piece; and Ewes, for sixty-four guineas a piece. In *Monk's Agricultural Dictionary*, there is also mention made of a Mr. *Richard Ashley* having Swine, the Boars of which he let to Sows at half-a-guinea each; and of a Mr. *Bishop*, who sold his Pigs, at weaning-time, for two guineas a piece. Such examples might also be produced here, if the requisite pains were taken; and the profits attending them are surely sufficient to gratify even avarice itself.

Above all, let the Farmer keep no greater stock than he can support well. The half of any given number of cattle, where they are well kept, will always be found to yield as much clear profit to the Owner, as the whole when kept in poor condition. Poor keeping also learns cattle to be unruly; and when they have learned this effectually, they only prove a bill of expense, instead of an article of profit, to the Owner.

STONES. Where arable lands particularly abound with these, no good culture can be carried on. The first step then is to clear such lands of the stones, and let this be done effectually; carrying off the small ones and diging out the large ones, so that there be no obstructions to the plough.

Some lands may indeed be too stony to be cleared of them to any present advantage. Let such be left to the prowess of future generations; they will undoubtedly find their account in clearing such, and find use for the stones. If they be not all wanted for fences, buildings, &c. they may be found useful in making hollow-drains, &c.

If stones be very badly shapen, so that they will not lie in a wall, perhaps the better way may be to throw them aside, and make hedge-fences; but if they be chiefly well shaped, let them be made into walls; for these, if properly made, will last an age, with some trifling repairs. The best method of making these is to dig a trench, where the wall is to be made, to the depth of about eighteen inches; into this throw all the small and bad-shaped stones, until the trench is filled; then on the top of these build the wall, in a mason-like manner, to the height of about five feet, and throw the earth dug out of the trench up against the wall on each side; and in this way it will stand for a length of time beyond the memory of Man. If a trench be not dug in this manner, the next best method is to plough deep trenches close on each side of the wall, after it is built, and throw the earth, thus ploughed up, against the wall.

Where stones are very large, and cannot be removed without breaking them, the best way is to split them to pieces. For this purpose, drill two holes in opposite sides, according to the grain of the stone; then fill each hole with two half-cylindrical pieces of iron, and between these drive a long steel wedge. In this way large stones or rocks may be split out into proper shapes for good building-stones, or for other purposes. Building fires on large stones will also render them liable to be broken to pieces, while they are thus heated.

By experiments accurately made, it is found, that small stones on the surface of the ground are beneficial, in a small degree, in increasing its products; but they are too troublesome, in good cultivation, to be desirable on account of all the benefit to be derived from them.

Where ground is full of small stones, they may be drove down so as to be out of the way of the sithe, by having a roller passed over the ground in the Spring, when it is very soft, as the stones are then easily pressed into it.

STOOKING OR SHOCKING. Let ten sheaves be disposed in two rows, each leaning against the other; then let two sheaves be laid on the top, so as that the but of one lies under the but of the other, having the heads hanging downwards. In this way, wheat or other grain will keep very well. Another method is to make little stacks, of an hundred sheaves or more in each. They are made with the heads inmost and uppermost; and, over the top of the whole, a large sheaf is tied close to the but-end, and the other end spread all round the top of the stack, to preserve it from the rains. This is, no doubt, the best method for saving the grain from the effects of long and heavy rains.

STRAIN OR SPRAIN. Horses are liable to strains, particularly in their shoulders. Anointing them with spirits of turpentine, in the part injured, will help them for a while; but will not afford a permanent relief. Washing the shoulder, when that part is affected, with brine, as warm as it can well be borne, will effect a cure in a few days. Doing it twice a day, and leting the animal rest from labor, will generally perform a cure in a few weeks, at farthest. If these will not answer, let warm poultices be applied, of bran, boiled in vinegar, with a sufficiency of hogslard to prevent its growing hard; let this be repeated, if necessary, until the cure is completed; and then mind to keep that part covered a while, so that it shall not be affected by colds.

STRAWBERRY (*Fragaria*.) The *Chili*, the *hautboy*, the *wood*, and the *scarlet strawberry*, are all esteemed; but the latter is mostly cultivated. A light loamy soil is best for raising them; and it should not be dunged much, lest they run too much, and of course be less fruitful.

They are first to be sown from the seeds, in a bed, which is to be kept clean of weeds. In this they are to be kept three years, before transplanting. They are to be transplanted in September or the begining of October. The ground into which they are to be transplanted is to be laid out into beds, four feet wide, with alleys between them, of the width of two feet. The plants are to be set fifteen inches apart, in rows each way. Mr. *Miller* says,

'The plants should never be taken from old neglected beds, where the plants have been suffered to run into a multitude of suckers; that those should be avoided which are not fruitful; and those offsets which stand nearest to the old plants should be prefered to those which are produced from the trailing stalks at a greater distance.'

When they become unfruitful, which is generally at the end of three years, they must be again transplanted.

Mr. *Miller* directs, that the vines be kept clear of weeds during the Summer; that all the runers, or suckers, be pulled off as fast as they appear; and they will produce a plentiful crop the next Spring after planting. The old plants produce the fruit; the suckers yield none until after a full year's growth; and they serve to rob the old plants of that nourishment which is so essential to their fruitfulness.

In Autumn, let the plants be again divested of their strings and runers, and the beds be again cleared of weeds. Mr. *Miller* directs that some Taner's bark be then spread over the ground, and this, when afterwards buried in the soil, will serve as a dressing for the vines. He further directs, that some moss be spread round under the vines, to keep the fruit from the ground. Straw will answer as well, for this purpose.

An improved method of cultivating the Alpine strawberry, is as follows:

'Sow the seed on a moderate hotbed in the begining of April, and, as soon as the plants have acquired sufficient strength, transplant them in open beds. They will begin to blossom after midsummer, and afford an abundant autumnal crop.'

Mr. *Knight*, who reports the foregoing method of treatment, thinks, that this plant should always be cultivated as an annual one.

Gypsum has a most powerful effect, when applied as a top-dressing, or otherwise, to strawberry-plants, not only in increasing their growth, but also their product in fruit.

STUBBLE. Where the stubble is large, as it will be where the grain is large, and is reaped, the ground will be very considerably benefited by ploughing it under as soon as the grain is taken off; whereas, if it be suffered to stand until it is perfectly dried, and all the juices evaporated, it will then do the ground little or no good. In this way, too, the seeds of many weeds are prevented from ripening.

But the Reader will observe, in the *Georgics of Virgil*, that the Author of that elegant Work particularly insists on burning off the stubble, in preference to ploughing it under, as being more beneficial to the succeeding crop, and as having a greater effect in fertilizing the land.

Mr. *Peters*, of Pennsylvania, is also of this opinion. He says that if straw, or other rubish, be spread over land, and then burned off, it will assist the soil more than if the same straw or rubish were suffered to rot on the ground. This we believe to be correct; but, whether, it be more advisable to let stubble stand till it is dry, and then burn it off, in preference to turning it under, before it has dried, is a matter that is perhaps well worthy of accurate experiment.

It should be observed, however, that some British Farmers prefer gathering the stubble for the purpose of litter, in which way it is converted into good manure, by absorbing the stale and juices of the dung of the cattle, much of which might be lost for want of something of this kind to retain it: But, whether the dearness of labor in this Country would warrant the expense, we are not prepared to say. Certain it is, however, that, where cattle are properly kept, a sufficient quantity of litter would seem to be indispensable.

SUGARCANE (*Arundo Saccharifera.*) There are varieties of this plant; but all contain the juice from which sugar is made. It requires a rich, deep, mellow soil. The ash-colored soil of St. Christopher's, and the red loam of the north side of Jamaica, have been found the best in the Westindies, for its culture. There is at present but a small proportion of our territory, where the climate is sufficiently mild for cultivating the cane to advantage; though it is believed that its culture may be gradually extended to the north, as the plant becomes better adapted to the climate in which it is grown.

For instance, let it be planted a mile farther north every succeeding year, and in this way it will gradually become contracted in its growth, and in the time required for growing it, until it might even, perhaps, be matured in the short Summers of Canada. As it would lessen in growth, it would, like Indian corn, admit of being planted more closely, and thus about the same quantity of cane would be obtained from the acre.

The lands in this Country, which are best adapted to the culture of this plant, are chiefly those which are alluvial, and the rich loams, which are generally dark-colored, being mixed with greater or less proportions of vegetable earth. Rich sandy or gravelly loams will probably answer very well. The soils on which Indian corn flourishes most are, we believe, well adapted for the cane. Whether it could be successfully cultivated on lighter lands, with the aid of gypsum, has probably never been ascertained; though we have little reason to doubt that this manure would act as powerfully on this as on many other plants.

As there is but a small portion of this Country adapted, at present, for the culture of the cane, so that perhaps not one in ten thousand of our Agriculturists is likely to be engaged in the pursuit; and as the whole process of raising the plant, and its subsequent management, would, if detailed at full length, considerably enlarge this volume; we must refer those who may stand in need of information, on this subject, to Mr. *Edwards'* History of the Westindies: But, for more accurate information, we would advise such to learn, from those engaged in this employment, the particular details of the culture, and process, as adapted to this Country, and improved since the time when Mr. *Edwards* wrote the Work in question.

The method most proper for raising the cane in this Country, as well as the time in which it is to be cultivated, are each different from what prevails in the Westindies. Here the plough should be the principal implement used in the culture; there, it is, partly from old habits, and partly from the steepness and roughness of much of the land, mostly performed with the hoe. Great improvements have also been made in this Country, in the process of distiling, since the publication of the Work in question.

The culture of the cane on the lands in this Country, which are adapted for it, is at present very profitable; and this will probably induce many to drive the business to the utmost extent, to the ultimate exhaustion of the lands. It was formerly a common saying, among southern Cultivators, of tobacco in particular, that by wearing out one farm enough could be made to purchase four new ones. Accordingly, much valuable land was laid waste, for the sake of immediate gain; and practising on this plan is still but too prevalent in the Southern States. Lands are there commonly used in a most barbarous manner.

At present, however, when lands must soon be rapidly rising, he who expects to be the gainer, by exhausting his lands, will find himself much mistaken. The sun never shone on an acre of land that was too fertile for the most profitable cultivation. Commonly, even new lands are much too poor to afford the greatest profits. Instead, therefore, of wearing out new lands, it should ever be the aim of the Planter to increase their fertility.

By the extensive culture of the Guinea-grass (*see* GUINEA-GRASS) in the Southern States, cattle may be raised in myriads, and with great profit; so that there need be no want of manure for the lands, and lands certainly cannot be made too rich for growing the cane.

We would therefore advise the Planters of that Country to beware of exhausting their lands in the culture of this plant, or any other; but to turn much of their attention to raising cattle, by means of the powerful aid just mentioned; and this will afford the requisite manure to keep the lands in the highest degree of fertility, and of course afford the greatest profit; so that one acre may yield more clear gain, than is commonly derived from four, in the usual culture of cane in impoverished lands.

SUNFLOWER (*Helianthus.*) It is found, that the seeds of this plant afford an oil equal to that of the olive-tree; and it is said, that seventy bushels of this seed may be raised from an acre. The plant will grow in almost any soil that is sufficiently strong. The seeds are good for feeding poultry, during the Winter season.

From a bushel of this seed, says the Editor of '*The Watchman*,' a gallon of oil, as fine as that which we import from Florence, may be obtained at any time, quite soft, bland, and fresh; and the mass that remains, after pressing out the oil, is of excelent use to feed hogs, poultry, &c. He further observes, that the Inhabitants of unwholsome places should be diligent in cultivating this plant, on account of the vast quantity of oxygene gas which it produces; it having been proved, that near twenty times as much of this gas is produced in twenty-four hours by one plant, in light and clear weather, as a Man respires, in an impure atmosphere, in that space of time.

The Editor of the '*Emporium of Arts*' has also noticed this native American plant, at considerable length; and suggests, with others, who have made trials of it in England, other valuable uses to which it may be applied; such as the fibres of the bark or skin, as a substitute for hemp; the stalks, when green, for the purpose of wattling, &c. and when dried, as an article of fuel; an acre yielding from three to nine wagon-loads; the pith as affording good tinder, and the leaves, when green, as excelent food for Rabbits, and serving for litter when dried.

There are eight kinds of this plant as enumerated by Mr. *Green*, in his Catalogue of American Plants; but the largest kind is recommended for culture. It should be raised in rows, and cultivated in the manner of hoed crops. It is easily raised, and gathered; the crop is a very sure one, and subject to little or no injury from rains, or otherwise, if left standing for some days after it is fully ripe. It, however, does not ripen all at the same time.

The oil is extracted from the seed in the same manner as that of flaxseed; it answers well for printing, and for painting; and the cake is good for fating cattle, beside the uses before mentioned.

It is believed that the culture of this plant, on an extensive scale, would be found very profitable.

SURFEIT. A disease to which cattle, and particularly Horses, are liable. In Horses, it is generally the effect of intense labor, or overheating. The skin becomes dry and full of dander, or of scabs, if the disease be more inveterate. The hair of the animal stands out, and he has a dull sluggish look.

Some have merely this look, and appearance of the hair, while they grow lean and hidebound, without any irruptions of the skin. Some have what is called a wet surfeit, in which case sharp thin humors run from the scabs. This is often attended with great heat, inflammations, and sudden swellings of the neck, which causes great quantities of briny liquor to issue from that part; and, if not allayed, will collect on the withers, and produce the fistula, or about the head, and produce the pollevil.

To cure the dry surfeit, the Author of '*The Complete Farmer*' directs, first, to take away three or four pounds of blood, and then give the following purge, which will work as an alterative, and should be repeated once a week, for some time:

'Take succotrine aloes, six drachms, or one ounce; gum guaicum, half an ounce; diaphoretic antimony, and powder of myrrh, of each two drachms; and make the whole into a ball with syrup of buckthorn.'

In the intermediate days, an ounce of the following powder should be given, morning and evening, with his feed.

'Take native cannabar, or cinnabar of antimony, finely powdered, half a pound; crude antimony, in fine powder, four ounces; gum guaicum, in powder, four ounces; make the whole into sixteen doses, for eight days.'

The medicine must be repeated till the Horse coats well, and the symptoms of the disease disappear. If the scabs do not come off, anoint them with mercurial ointment. This ointment alone, well rubed into the blood, and aided by purges, will also commonly effect a cure.

For the wet surfeit, bleed plentifully, avoiding externally all repelers, and in the morning, while fasting, give cooling physic twice a week, composed of four ounces of lenitive electuary, four of cream of tartar, and four of Glauber's salts, quickened with a little jalap.

After three or four of these purgings, give two ounces of nitre, made into a ball with honey, every morning for a fortnight; and, if successful, repeat this a fortnight longer. The above may also be given with the food of the Horse; or a strong decoction of logwood may be given alone, at the rate of two quarts a day. Where the disease proves obstinate, the medicine must be continued a considerable length of time, to prove effectual.

The Horse should be kept dry, and his food should be cool and opening. If he be hidebound, give him fenugreek seeds, for some time. Where the disorder proceeds from worms, give the mercurial physic, and afterwards the cinnabar powder, as above directed.

The Author, from whose work the above directions are taken, observes, however, that as this disease is not always original, but attendant on others, in the cure, regard should be had to the first cause, and thus the removal of the complaint may be variously effected.

SWARD. A stiff green-sward is an infallible indication of the ground being in good condition for bearing a good crop; but it is not an equally certain indication of a good soil; as the sward may be the effect of strong manuring. Some soils again which incline to moss, when they have lain untilled for some time, exhibit a greater degree of poverty than they really possess. Earths, however, which, without manuring, bear a stiff green-sward, may always be pronounced good, whatever may be their color; but perhaps only good for certain productions.

A stiff sward, well turned over, will generally bear a pretty good crop, of any growth which is suitable to the soil; as the roting of the sward keeps up a fermentation in the soil nearly equal to that which is produced by repeated ploughings. This remark, however, more properly applies to rich mellow soils: Those that are naturally stiff or hard, will not generally ferment sufficiently to bear a good crop, by the mere roting of the sward.

A clover-sward, that has been mowed and well turned over, makes a very fine lay for wheat, where the soil is not too stiff or hard; but, where the clover has been fed off, it is not considered quite so good; as in that case the ground becomes harder by the treading of the cattle. Much, however, in that case depends on the natural mellowness of the soil.

Clover forms but a crumbly sward; timothy is stiffer; but the English bluegrass *(poa compressa)* forms one of the strongest. This, where it is very strong, and the soil full of vegetable matter, may be cut and used as turf.

Strong swards usually accumulate along the sides of fences, and where cattle much resort, which may be used to advantage in composts.

See MANURES.

When the sward of mowing-ground binds too much, it is usually most advisable to break it up and till the ground. If this be not done, scarifying and compost-manures are to be resorted to. The binding of the sward, in mowing or in pasture-grounds, is principally the effect of close feeding. Let a sufficiency of fog, or aftergrass, be left on such lands, and they will not be apt to bind.

Generally speaking, there is no method so easy, and cheap, of covering dry soils, which are poor or exhausted, with a fresh green sward, as the use of gypsum; and this should always be done, before such grounds are broken up; as, in that case, double, or perhaps treble, the crop may be expected from them, that they will yield if broken up with a light, poor sward on them. Let the gypsum be sown on such lands early in the Spring; and by the first of the following July they will be covered with a fine sward of white-clover; and, when land is well covered with this grass, it is in good condition, with the aid of good tillage, to bear a plentiful crop.

SWARTH-RAKE. This is a rake about two yards long, with iron teeth, and a bearer in the middle; to which a Man fixes himself with a belt, and, when he has gathered as much as his rake will hold, he raises it and begins again. *Complete Farmer.*

For another kind of rake, *see* HAYMAKING.

SWINE. '*The Cattle Society of Pennsylvania*' recommend crossing the *Guinea breed* of Hogs with the best kinds of our common Swine, which, they say, forms a breed the most profitable of any.

The *Chinese breed* are very good. The large longbodied Hogs, with long ears leaning forward, are most profitable to faten the second year.

Particular pains should be taken to select and improve the breed of Hogs, as some kinds are much more profitable for raising than others. After a proper improvement of the breed, the next point is to select the finest for Breeding-sows, and for Boars.

The marks of a good Hog are, a moderate length, in proportion to the size of the body; the nose short, the cheek plump and full; neck thick and short; quarters full; carcase thick and full; hair fine and thin; with a symmetry adapted to the breed to which it belongs. Above all, it is essential, that it be of a kindly disposition to faten early. The longnosed Hogs should be avoided.

The Sow will bring forth a stronger and better litter, if kept from the Boar till she is a year old; and he should be kept till that age, before he is put to Sows. He should be kept in good condition for the purpose; and, as the Compilers of '*The Complete Grazier*' say, should not serve more than ten Sows in a year. The Sows should also be kept in good condition, but not too fat; as in that case they will not produce an abundant litter of Pigs. As they will usually pig twice a year, they should be put to the Boar at such times as will bring one litter in April, and another early in September. To cause them to go to the Boar, if they miss the right season, give them some parched oats in their wash, or the small end of a runet-bag. If well kept, however, they will seldom require any stimulous to coition at the proper times.

Those are reckoned the best breeders which have about ten or twelve paps. They should be kept clean and well littered; but should not have too much litter at the time of piging, lest they overlay their Pigs in it. At the end of a week or ten days, they should be let out of their sties into the yard, for three or four hours each day. Where several Sows are farrowing, about the same time, they must be kept in separate apartments in the sty, lest they devour the Pigs of each other. Young Sows will sometimes eat their own offspring, which may be prevented by washing the backs of the Pigs in an infusion of aloes; and, for this purpose, the Sows must be watched when bringing forth. It is said, that supplying them with plenty of water, at this time, will prevent any mischief taking place of this kind.

The sucking Pigs, intended for market, should be killed at the end of about three weeks. The finest ones should be saved. By this time the rest will be able to follow the Sows, when the males may be castrated, and at the end of another week the females may be spayed. This latter operation will greatly promote the growth and fatening of the females. The castration and spaying may as well, however, be defered till the age of six weeks.

Where the Pigs are to be weaned, Mr. *Young* says, it should be at the age of two months; and they should be kept in a sty by themselves, and suffered to run into a yard.

They should be kept clean and well littered, and should have plenty of food, which may be boiled potatoes, or carrots, for a fortnight; when raw ones will prove good food. They should also be baited every day for a month with oats, and after this may have thin drink of pea or buckwheat meal (Indian meal will no doubt answer as well) boiled in water, unless there be a dairy; in which case, a mess of milk or whey may be substituted. Too much should not, however, be given them at once, as Mr. *Deane* says it is known sometimes so to inflate them with wind as to kill them. Mr. *Young* says, their being kept very cleanly, so as to have fine clean coats, is as essential to their growth as good feeding, until they are turned out with the larger Hogs into the clover field, which, after the age of three months, will keep them very well during the rest of the growing season.

It has been uniformly remarked, that though these animals are naturally filthy, if left to themselves; yet, the cleaner they are kept, the better they will grow and faten.

Boiled or steamed clover-hay will serve to keep Hogs during Winter; but, perhaps, the addition of some potatoes or carrots, boiled with the hay, would be very proper. The clover should be cut a little sooner than usual, and should be well cured, and have about a peck of salt to each ton, when laid down in the mow.

For boiling, in this case, as well as for boiling roots, and for other purposes, *see* STEAMBOILER.

The Sows may be allowed to breed till they are six years old, and the Boar until he is five. After this, the former is to be spayed and put up to faten, and the latter is to be castrated, as being no longer fit for use. His flesh will make good bacon, when fated.

In preference to feeding Swine on clover in the field, during Summer, Mr. *Young* directs soiling them in a yard for the purpose; and in this case he makes use of lucerne, cichory, clover, tares, and other green food, cut and carried in for feeding them. The water-crowfoot (*rununculus aquatilis*) is also highly recommended for this purpose. This method, however, though it may save some ground in pasture, and may afford the means of making considerable manure, does not seem so apparently beneficial, as the practice of soiling some other cattle. Mention is made, by Mr. *Young*, of his having fed sixty-four Hogs, great and small, on two acres of clover alone, during one season, and that they all grew very well. The pasture in which they are kept should have a supply of water. Before they are turned into the pasture, and while they are young, let the top of the gristle of the nose be pared off with a sharp knife, which will ever afterwards prevent their rooting up the sward. It answers the same purpose as ringing them.

Perhaps the best method of keeping Swine, during Summer, is to have two small enclosures; the one to be kept for feeding them, while the [illegible] is under tillage for a fresh supply of clover, or other good grass, when that in the first has failed. And as they are fond of sweet apples, which not only serve for food, but will even help to faten them, let the enclosures be planted with a few trees of these, of the best yearly bearers, selected for the purpose; some being early ripe and some later; in order that a constant supply may be afforded during the season. The trees should, however, not stand so closely as materially to injure the ground for cultivation. Peachtrees may also be advantageously used for the same purpose, till the appletrees have sufficiently grown.

Boiled clover has been mentioned, as affording a good food for Hogs during Winter. In Greatbritain, boiled carrots, potatoes, turnips, &c. are mostly used for the purpose, by those who go largely into the raising of Swine.

Hogs for fating should be in a healthy state; and, to increase their appetite, let a dose or two of sulphur be given them in their food. Change of food is also good to increase their appetite; but laxative food should be avoided, as they are seldom costive. Wh[illegible] found so, a little rye will help them. Probably changes of boiled roots, and of meal and water, at intervals, would be found best. Mr. *Young* says, the best method of feeding all kinds of grain, to Hogs, is to grind it to meal, and mix it with water, in cisterns made for the purpose, in the proportion of five bushels of meal to a hundred gallons of water; the mass to be well stired several times each day, until it has fermented and become acid, when it will be ready for use. In this way two or three cisterns must be kept for fermenting in succession; but he says, the profits will amply pay the expense.

For the same reason, the grains of distileries, and the refuse of starch-factories are excelent for fating Swine. Mention is made of one of the latter at Lambeth (Greatbritain) affording sufficient to faten ten thousand Hogs in a year. Peasoup is also accounted excelent for fating. Boiled Indian corn is also very good; or this grain may be soaked so as to answer well; though perhaps it is better ground into meal. Indian corn of a former year's growth is much the best.

In recommendation of peas, together with a mixture of barley-meal, being used for fating, the Compilers of '*The Complete Grazier*' assert, that the pork fated with this grain will rather swell in boiling, and have an improved flavor;

while that fated with beans will shrink much in boiling, will lose much of its fat, and be of inferior taste. The cause of meat sometimes shrinking very much, and losing much of its oils in cooking, seems not to be well understood; though the knowledge necessary for preventing it would be highly desirable. Generally speaking, it is believed, that the more fully any animal is fated, the less its meat will shrink and part with its oil in cooking.

Mr. *Peters* says that Hogs, while fating, should constantly have some dry roten wood kept in the pen, which they will eat occasionally; and that he finds it very beneficial to them, for the purpose of keeping them in a proper condition for fating. He also says that food, when soured by a proper degree of fermentation, is much the best for fating, and that one gallon of sour wash will go as far as two of the sweet, for this purpose. He disapproves of soiling Hogs, and says the clover pasture is much the best for them.

Whatever method of fatening Swine may be adopted, it is essential that they be kept *warm* and *clean*, by having plenty of litter, particularly when the weather becomes colder, and by having the sty frequently cleaned; and, that they should have as much solid food and drink as they require. Their meals should also be regular, and as nearly equi-distant in point of time as possible.

In the work last mentioned, [illegible] is observed, that where many Hogs are put up together to faten, they will fall away at first, if ever so well fed; which is attributed to the noise and confusion produced among them, by this new state of keeping; that, in such cases, it is not unfrequent for one of the family to become so much the object of hatred to the rest, as eventually to be killed by them; and, that it is much the better way to have them in a number of small companies, detached from each other, so that the noise and bustle will be less, and in order that they may more unmolestedly enjoy that repose which is most suitable to their drowsy faculties. For this purpose, the sty should have a number of distinct apartments, separated by close partitions from each other, and where the inmates of each can come forward separately to the general feeding-trough, and retire separately again to rest.

Where a Hog has surfeited itself by eating too much, give it half an ounce of flour of sulphur in some wash, once or twice a day, for two or three days; by which time its appetite will be restored. Mr. *Deane* advises, that posts be set up in the sty for them to rub against, as they are usually much inclined to rub themselves.

The business of fating Hogs should be begun so early in the Fall, as to be completed before the cold weather sets in; as after this they will faten very slowly. Let it be commenced by the middle of September, and then the killing may commence about the middle of November.

Swine are liable to some diseases, which are here noticed, with the best remedies for them.

Measles. This disorder is mostly in the throat, which is filled with small pustules, and sometimes these appear on the outside of the neck The animal affected looks languid, with red eyes, and loses flesh. *Cure.* Give him small quantities of levigated crude antimony in his food.

The mange, like the scab in Sheep, is a cutaneous irruption of the skin, occasioned by want of cleanliness in the hogsty. It is known by the violent rubing of the animal, till he tears the pustules, and thus produces scabs. The cure, as directed by Dr *Norford*, is first to wash the animal well with strong soapsuds; then anoint him with an ointment formed of an ounce of flour of sulphur, two drachms of fresh pulverized hellibore, three ounces of hogslard, and half an ounce of the water of kali. This is to be rubed in at one time, and is sufficient for a Hog weighing an hundred. If properly applied, no repetition will be necessary, if the Hog be afterwards kept clean. Where he has a slight cough, he directs doses of antimony, from half an ounce to an ounce and a half, according to the size of the animal, to be finely pulverized and mixed with his food, for ten days or a fortnight. But where, from long neglect, the neck, ears, and other parts become ulcerated, they should be anointed every third or fourth day with an ointment made of equal parts of tar and mutton-suet, melted together, till the cure is completed.

The murrain, or leprosy, in Swine, is known by the shortness and heat of the breath, hanging down of the head, staggering, and secretions from the eyes. It is said to be caused by hot seasons, when the blood becomes inflamed.

Remedy. Boil a handful of nettles in a gallon of small-beer; add half a pound of flour of sulphur, a quarter of a pound of anniseeds, pulverized, three ounces of liquorice, and a quarter of a pound of elecampane; and give this mixture in milk, at six doses.

The gargut is an inflammation of the udder, by being filled with coagulated milk. It chiefly happens where Sows are too fat at littering; and where they are thus affected the Pigs will not suck. In slight cases, the udder may be bathed with camphorated wine; but the milk must be squeezed out by hand, if possible. If relief cannot thus be given, it is best to kill the animal.

Dry cough, and wasting of the flesh, is best remedied by a dry warm sty, with a regular supply of food that is calculated to keep them cool, and to allay the irritation of the lungs.

Fever, or *rising of the lights*, seems to be caused by over-feeding; and may be removed by doses of sulphur and oil.

The staggers. Swine afflicted with this disorder suddenly turn round rapidly, and, if not assisted, will die in half an hour. *Remedy*. On opening the mouth, a bare knob, in the roof of it, will be discovered; cut this away, and let the wound bleed; make a powder of loam and salt, and rub the wound with it, and then give the beast some urine, and he will presently recover.

This remedy, Mr. *De Gruchy*, a Distiler, who fatens many Hogs, says he found to be effectual, if applied in time.

Like many other employments, that of rearing and fating Swine will be found more profitable, the more largely and spiritedly it is entered into; and in order to this the Farmer must have his hogsty of an adequate construction; his pastures adjoining; his steamboiler; his clover-hay; together with a due supply of roots and grain for feeding and fating. The business is most advantageous when connected with a proportionate dairy; but, by following the plan above laid down, may answer very well without.

Note. This article being essentially the same as the article Swine in a former edition of this Work, we deem it proper now to add, that Mr. *Cobbett* has lately introduced a new breed of Hogs into this Country, They are entire[illegible] black, short-nosed, and well proportioned. Mr. *Cobbett* declares them to be incomparably superior to the best breed known in Pennsylvania; and that such is the case with which they may be completely fated, even at the age of a twelvemonth, that the Swedish turnip, or Rutabaga, when steam-boiled, is amply sufficient, of itself, for the purpose.

This breed will, no doubt, be rapidly propagated and extended throughout Longisland, where Mr. *Cobbett* at present resides; while his liberality and public spirit, displayed in the introduction of these animals, as well as his efforts in forcing the advantages of the turnip-culture upon the attention of our Agriculturists, entitle him to the thanks of the Country.

He very justly deprecates the breed of lean, illmade, longnosed Hogs, that are too commonly found in this Country, but more particularly in the Southern States. They are indeed the meanest of all the 'swinish multitude,' and cost nearly as much to faten as they are worth when fated.

T.

TAURINO CLOTH. Mr. *Shotwell* has manufactured cloth, to which he gives the above appellation, of the hair taken from hides at the taneries, mixed with one-third, one-fourth, and one-fifth part of common wool. The Society 'for the Promotion of useful Arts,' in this State, appointed a Committee to examine the specimens of these cloths; who reported that they found them well manufactured, of equal quality and texture, well *died*, and apparently firm and strong; that these cloths are not only lighter than that made of wool alone, but that they have the property of resisting moisture, to a much greater degree, and are therefore much better calculated for great-coats; and that, from actual trial, an equally elegant and more durable carpeting may be made from either of these mixtures, than that made entirely from wool. They also reported,

'That, from documents accompanying the specimens, it is certain that a cloth equal, if not superior, in elegance and durability, is manufactured from hair alone; and that it is a valuable substitute for felting, in the paper-manufacture.'

TEAMS. Our teams are of three kinds; teams of Horses, of Oxen, and of Oxen and Horses together. In Spain and Italy, they have teams of Cows, and sometimes of Cows and Bulls together. In the northern parts of Europe, the Reindeer has been subjected to the harness; and Mr. *Livingston* is of opinion that the Elk and the Moose might also be brought under the like subjection, to advantage, in this Country.

The advantages of Horses in teams are their superior docility and quickness of motion; and their disadvantages are their greater expense in raising and keeping, and their being of no value after their time of service is over. On the contrary, the advantages of Oxen are their cheapness in raising and keeping, and their value for beef, after their proper time of service has expired; and their disadvantages are their slowness of motion, and their greater untractableness. Probably they might be rendered more tractable, if some effectual method were devised for driving them with lines: In that case, the extra expense of a Hand to drive them in ploughing would be saved, and the ploughing better performed.

Say that a good span of Farming-horses are worth, at four years old, one hundred dollars: At fourteen years from that time they are worth little or nothing; of course, another sum of one hundred dollars must, at the expiration of that time, be expended in the purchase of a new span. This sum, to be paid at the end of fourteen years, is about equal to fifty dollars paid down. In order, therefore, to keep good the span, a capital of one hundred and fifty dollars is necessary; which is equal to an expenditure of ten dollars and fifty cents a year.

A yoke of Oxen, at four years old, are worth, say, sixty dollars; and allowing them not to depreciate in value, till turned off for fating, they require an expenditure of four dollars and twenty cents a year, as the interest of the capital laid out for them.

Say that the Horses will cost fifteen dollars a year more than the Oxen to keep them, and provide harness for them; say also, that they do an hundred day's work in a year, and that the Oxen, working a third slower, require one hundred and thirty-three days to perform the same labor: Then, if one Hand only is employed with the Oxen, his wages and board, during the extra thirty-three days, at fifty cents per day, would still leave a balance in favor of the Oxen of four dollars and eighty cents for the year's work; but if they should require a Boy to drive, while another Hand holds the plough, then the balance would be very considerably in favor of the Horses.

On the whole, it is believed, that Oxen may be found the most profitable team in some situations, particularly in new countries, and in rough lands; and in other situations again, such as in smooth lands, and where the best cultivation is required, probably, Horses ought, for most uses, to have the preference.

Lord *Kaims*, however, expresses an opinion very different from this. He says that Oxen are preferable for husbandry, in many respects. They are cheaper than Horses, as it regards their food, the method of keeping them, the superiority of their dung, their being subject to fewer diseases, and their suffering no deterioration by age. He says, that a couple of Oxen in a plough require not a Driver more than a couple of Horses; that the Dutch, at the Cape of Goodhope, plough with Oxen without a Driver, and exercise them early to a quick pace, so as to equal Horses both in the plough and in the wagon; that the People of Malabar use no other animal for the plough, nor for burdens; and that, about Pondicherry, no beasts of burden are to be seen but Oxen. He further justly remarks, that, if Oxen were more generally used, the articles of beef, candles, and leather, three essential necessaries of life, would become much cheaper.

The Compilers of '*The Complete Grazier*' also say, that Messrs. *Culley*, of Northumberland, Greatbritain, employ one hundred and fifty Oxen in the draft; that they are used singly in carts, and two in a plough, with cords or lines, without a Driver; but that they do not perform their work with the same dispatch as Horses. They further observe, that, 'in the north of England, it is not an unfrequent occurence to see a light Ox saddled, and briskly troting along the road, obedient to his Rider's voice;' and that 'Sussex

Oxen have beaten Horses at the plough, in the deepest clay.' They recommend the Hertfordshire and Devonshire Oxen, as being the most speedy.

See the description of the Devonshire breed of Oxen, under NEAT-CATTLE.

The slowness of Oxen is partly natural and partly acquired by overloading them. This, therefore, should be avoided. When their work is easy, they may be quickened without hurting them, and their contracting a habit of moving so slowly, as some do, may be thus prevented. They always become slower as they grow older; and for that reason they never should be kept longer than such age as they will still make the best beef, which is probably about the age of seven or eight years.

In a team, of part Oxen and part Horses, either the gait of the Oxen must become quickened, or that of the Horses made slower; but, perhaps, a little of each would be the consequence, and in this way the Oxen would be the better, though probably at the expense of injuring the Horses for almost every kind of work, when worked by themselves.

Mr. *Livingston* makes mention of a contrivance he had seen in Italy, that was attached to the noses of the Oxen, which was principally used for governing them; and by means of it he thinks he had seen them drove with lines. 'It consists (says he) of two flat pieces of iron that turned at the lower ends, and formed a forceps; these bars shut over, and, when closed, the ends gently pressed upon the cartilage of the nose of the Ox. They were kept close by being tightly bound at the top, and straped against the forehead of the Oxen.'

'If we may argue the utility of a practice from its extent (says Mr. *Livingston*) we must prefer drawing by the horns to any other mode; nine-tenths of Europe make their cattle draw in this way, and from what I have seen of their performance, I am persuaded that it is to be prefered to the yoke. A Bull's strength appears to be placed in his neck, and in drawing in this way the whole of it is exerted; his motion is not impeded, or his skin chafed as it is by the yoke.'

'In the mountains of Savoy (says Mr. *Livingston*) I saw many cattle, chiefly Cows, drawing by the horns, not in carts but in wagons. How far the working of Cows is advantageous, deserves consideration. It is observable, however, that our Cows are in general much smaller than those usually worked in Europe.'

'Yokes (he observes) are used in some parts of Italy, but they differ from ours. Instead of bows, there are four flat pieces of wood, which hang from each side of the yoke, and are about ten inches long, and hollowed so as to fit the sides of the neck: They are so thick as to admit a rope or chain to pass through them, by which they are fixed to the yoke, and each pair of them are united by a chain, or rope, under the Oxen's neck You will see that the draft is in this case by the top of the shoulders only, and I believe it is to be prefered to our bows, on that account, because the bow, by pressing the shoulder-blade, impedes the motion of the animal.'

For holding back, whether they draw by these yokes or by the horns, he says 'the end of the pole projects considerably beyond the heads of the cattle, and turns up very much; to this is fixed a leather strap that goes round the horns of the Oxen, so that they keep back the weight by their horns, and with much more ease than ours do by twisting their necks.'

In England, they are worked in harness, which, were it not more expensive, and more troublesome, ought to be prefered to the method practised here.

We think it highly probable, that the great pressure of the bows of our yokes against the shoulders of the Oxen, and the enormous weight they are often injudiciously made to bear on their necks, when in carts, are the principal causes of our Oxen moving slower the longer they are used.

In all teams, where two animals draw against each other, the weaker one should have the longer end of the ox-bow, or whiffletree, by which they draw, in order that when drawing they may pull evenly.

If Oxen learn to crowd each other, use them to a shorter bow; if they draw apart, use them to a longer one.

THA, OR TEA-TREE. This plant is mostly grown in the more mountainous districts of China, and is best adapted to a light rocky soil. There are two kinds of tea made from the plant; the green, and the black. The latter acquires its dark color by exposure to the sun, in drying; and is also made from the coarser and more indifferent leaves.

For raising the trees, the seeds are planted in March, by puting seven or eight into a hole; out of which number not more than one-half commonly vegetate. The young plants are afterwards transplanted in rows, at the distances of three or four feet each way. They yield crops of leaves the third year after planting, and require to be renewed every five or six years, as the leaves then begin to grow too hard, to be any longer valuable.

On the more tender branches grow small soft berries, of a green color, filled with yellow grains; and the other branches bear pods of a larger size, of different shapes; some round, which contain but one pea, and others of some length, which commonly have two or three. The plant, in some parts of China, is not suffered to grow to a height of more than six or seven feet; in other parts, to the height of ten or twelve. In the southern Provinces of that Country it is considerably used for making hedges.

The leaves are gathered at the begining, the middle, and the end of Spring, and their color differs at each time; the first being bright, the second livid, and the third deep-green. The qualities of the leaves depend on the times of gathering; the first being the best, the second midling, and the last of the least value. Their qualities, at each gathering, depend also on the parts of the tree whence the leaves are taken; those of the higher parts, being the tenderest, are the best of the crop; those of the lowest, the hardest and worst; and those of the middle, of a medium between the two extremes.

After each gathering, the leaves are exposed to the steam of boiling water, and are then made to shrivel, or roll together, by being placed on plates made of copper, of iron, or of baked earth, with a fire underneath. The leaves of the meaner sorts are then dried in the sun, which darkens their color, and these are the black teas. The better leaves are not exposed to the sun in drying, and these are the green teas; and in the preparation of some of the finer sorts, particularly that called *tchu-tcha*, every leaf is rolled singly by hand, the finer preparation of which we call *gunpowder* tea.

Mr. *Osbeck*, a Traveler in China, says that tea, in the course of preparation, passes through many dirty hands; and that in packing it down in chests it is troden by the naked, and sometimes bleeding, feet of a Chinese Porter, in a state of perspiration. As the Chinese are proverbial for their nastiness, it were to be wished that our Females, who are so attached to drinking tea, could see the manner in which it is prepared; as this might probably tend very much to lessen their relish for this exhilirating, but enervating, beverage, that has added the hysterics to the catalogue of their disorders, and that has probably contributed much towards making the Chinese a race of Cowards, from the Emperor down to the meanest Peasant.

The tea-plant has been successfully raised in England, from seed brought from China, and might probably be raised here, with equal success, in all the States south of Pennsylvania. It is doubtful, however, whether it could be cultivated here so as to be afforded as cheap as that imported from China; owing to the great disparity in the price of labor in the two Countries. There has been considerable difficulty in making the seeds of this plant germinate, when brought from that Country. In the '*Emporium of Arts, &c.*'

it is stated, however, that the vegetative power of seeds may be long preserved, by being kept among raisins, in boxes.

See also, SEEDS, for other methods of making old seeds germinate.

THORN *(Crataegus.)* There are many varieties of this tree in this Country, some of which may be found more valuable for making hedges, than others. One general rule should, however, be observed in making a selection, and that is, to take of those which grow naturally in the Country where the hedge is to be made. In more northerly climates, the red-fruited *(Coccinea)* is most common, and perhaps as valuable as any, for the purpose. In the Middle States, the Washington thorn *(Cordata)* seems to have the preference.

There has existed considerable difficulty in making the seeds of American thorn vegetate. A successful method, pursued by Mr. *Kirk*, of Brandywine, for this purpose, is to wash the seeds clean; put them in hot water to swell them, expose them at night to be frozen in the water, and in the day thaw them in the sun; and by repeating this operation, four or five times, he found them open and fit for planting.

They are to be planted in beds, and covered to the depth of not more than two inches. After they have come up, they may be transplanted into other beds, and are to be kept clear of weeds until they are set out, which should be when they are at the height of about two feet.

THRESHING. This, when performed with flails, is but slow work. Threshing with Horses is considerably more expeditious. Some of the German Farmers of this county and its vicinity thresh with a roller, which turns on a centre at one end, which is small and confined to the floor, at that end, by an iron pivot on which it turns, and the other end is large in proportion to the increase of the circle it makes. It is drawn by a Horse, and is usually about twelve feet long. It is set full of little square pieces of wooden teeth, leaning outwards, with the ends cut off slanting, agreeably to the superfice of the roller. With this a Man and Horse will thresh out about twelve bushels of wheat in a day.

In Virginia, where the greatest crops of wheat are raised, they generally thresh them out in the fields; and for this, some use threshing-machines, and some make circular floors of eighty feet diameter, or more; on this the wheat is set with the heads upwards, and then wagons and Horses are drove round on it till that floor is threshed; then more is constantly thrown on, till a hundred bushels, or more, are threshed out; when they separate the wheat from the straw by forking it up; clean the wheat; and then proceed as before, till the business is completed. Threshing-machines are, however, the best; and the expense of them is but a trifle for those who raise large crops of wheat and other grain.

For a threshing-machine, which is probably the best that has been yet invented, we refer the Reader to AGRICULTURE, in the American edition of the *Edinburg Encyclopedia*, published in the city of Newyork, by Messrs. *Whiting & Watson*. The invention is that of Mr. *Meikle*. A machine of this description, on a large scale, and drove by water, separates wheat from the stalks, and fans or cleans it, at the same time, at the rate of sixty bushels an hour.

One, on a smaller scale, and which requires two Horses to work it, and three Hands to attend it, will thresh and clean sixty bushels of wheat, or double that quantity of oats, in eight hours. The Writer of the article adds, that 'rollers or small millstones are added to many of these machines, for crushing or grinding grain for Horses, Swine, &c. Knives, for cuting straw, and many other useful appendages, might be added.' This machine has also been put into operation by wind.

See further, WIND-MACHINERY.

It should also be added, that this machine separates the grain from the straw much cleaner, than is usually done with the flail.

TILLAGE. A great part of this Work relates to tillage, or the culture of land; the Reader must therefore refer to the various articles which treat of this subject in all its branches. Any uncommon mode of culture, however, or any miscellaneous observations relating to the subject, will naturally form the substance of this article.

Under SOILING OF CATTLE is laid down a method of tilling a small piece of land, wherever such may be found suitable for the purpose, which we have ventured to recommend. The mode of culture there recommended is uncommon; the land is divided into narrow strips, and these are to be ploughed but one way. Further, therefore, to assist in convincing the most bigoted, that there is nothing extravagant in the plan of cultivating in narrow strips, and ploughing but one way; the mode of cultivating two fields, which is practised by the Inhabitants of *Market-weighton*, in Greatbritain, as published in the '*Rusticum Museum*,' shall be here noticed.

These People have five fields, in common, for culture; three of a clayey soil, and two which are more sandy. The latter supply them with rye, hay, and pasture for their

Sheep, &c.; and are tilled in the following manner: The fields are raised in ridges, which are four mowing-swaths wide; the middle or higher part of each ridge, of the width of two swaths, is cultivated for rye, and the remainder of each, or the moister parts, alternately for mowing and pasture. When the rye is growing the grass-strips are mowed; and the next season, when rye-strips are fallowed for another crop of that grain, the grass-strips afford pasture for their Sheep, &c.; the dung and stale of the flock serves as a light manuring for the ground every fallowing-year; and this serves constantly to produce strips of good rye, and mowing-ground the next year. It would seem, by the description given of these grounds, that the soil is somewhat wetish though sandy. Here, then, is ground tilled to advantage, as is said, in very narrow strips, and without any cross-ploughing. It is however believed, that such fields might be cultivated to much more advantage, on the soiling-plan, heretofore recommended, or something similar.

In tilling lands, it is essential that it be done *in the right season;* that it be done *effectually;* and, in order to this, it is of the first importance to have the implements of tillage *well constructed*, and kept in *good order*.

Again, lands should always be applied to that tillage for which they are best adapted; or, in other words, in which they will constantly yield the greatest *clear profit*. If, therefore, the Farmer has lands which are only fited for grass, let him not work against wind and tide in trying to raise grain on them. If he has broken hills and declivities, they will generally but poorly repay the unpleasant labor of cultivating them with the plough and the hoe: Rather let such be kept for Sheep-walks, for orchards, for raising timber, or perhaps for the culture of the vine, as they may be found best adapted. If his lands are rocky and stony, to plough and hoe them is a difficult uneasy employment; and never can be productive of much profit, till the impediments to the plough and the hoe are removed. If they are too light and sandy, they may nevertheless be made to yield good crops of taprooted plants, such as turnips, carrots, and clover; or of such as ripen early, as rye, for instance; or that bear drought well, as burnet, saintfoin, lucerne; or of such trees as flourish in sandy soils, as the locust, Lombardy poplar, olive, &c. If lands be boggy, when well drained, they will be found very profitable for hemp, which they will bear yearly, with the aid of small yearly additions of manure; but, if they be moderately level, smooth, and of a good medium soil; that is, such as is equally adapted for grain and for grasses; there let the Farmer pursue the culture of a rotation of crops, in such manner as he finds will afford him the greatest clear profit; and in doing this, it is believed, that he cannot adopt a better plan than that recommended under SOILING, &c. or something similar.

The expense of any kind of tillage never should be regarded, where clear profits proportionately great may be safely calculated on, as a general result. Thus, if it cost fifty dollars to till and gather an acre of carrots, and that acre, upon a yearly average, will give five hundred bushels, the crop, at eighteen cents a bushel, which is certainly not too high, gives thirty-five dollars per acre, as the clear profit, after taking out five dollars an acre for the use of the land; a profit much greater than can be commonly realised by raising any kind of grain. Neither should the expense of tillage be regarded where the clear profits will be great, though not to be realized in some years, if it may be calculated that such profits may certainly be expected.

TIMBER. The right time for felling trees for timber is in December and January, when the sap is down, as in this case it is less liable to be eaten with worms, and will last much longer.

By experiments of M. *Buffon*, it is found that trees which are striped of their bark in May or June, while standing, and then cut down the next Winter for timber, are found to make the most solid, heavy, and strong timber, and that even the sap is then good. The bark of oak, and some other trees, may, at that time, be striped off to advantage for the use of taning.

Soaking timber in salt-water is very good to increase its strength and durability.

In order to preserve timber from cracking, while seasoning, let it be blocked out for the purposes wanted, and laid in a hay-mow when the hay is carted in. When the hay is dealt out the next Winter, the pieces may be taken out well seasoned, and free from cracks. This is an excelent plan for seasoning all kinds of timber for carriages, &c. When this is to be done, if the trees be felled in Winter, let them lie in logs until haytime arrives.

The right time for cuting down trees for timber is, when they are in their prime; as the wood will then have arrived to its greatest perfection, for hardness and durability.

In addition to the foregoing, we are assured, from an experienced Builder of some of the firstrate bridges in the northern part of this Country, that such timber as is to be exposed to the water, or to frequent wetness, should be felled during the *increase* of the moon; and that such, as is intended to be kept dry, should be felled during the *decrease* of that planet. We find it also ascertained, by satisfactory experiments, as published in 'the Memoirs of the Philadelphia Society for the Promotion of Agriculture,' that timber, used for posts, will last considerably longer, by seting the end in the ground which was uppermost as it grew.

TIMOTHY-GRASS *(Phleum Pratensis.)* This is a coarse grass, but agreeable to all sorts of cattle, and suitable to low moist grounds. It is a native of America. The name of *Timothy* was given it in the Southern States, by its having been carried from Virginia to North-carolina by one *Timothy Hanso.* It is also called *bulboue catstail-grass.*
See GRASSES.

TOBACCO *(Nicotiana)* This plant has its name from *Tobago*, one of the Carribee islands. It was first introduced into England, and thence into Europe, by the famous Sir *Walter Raleigh.*

For raising the young plants, burn a piece of ground early in the Spring, rake it well, and sow the seeds. When the plants have acquired leaves of the size of a shilling piece, transplant them. They require a dry, light soil, and a rich one, well mellowed with ploughings. Dung of the hotest kinds are suitable to it, though cowdung in sandy soils will do well for raising it. Transplant the young plants when the ground is wet, as in the case of cabbage-plants, and afterwards hoe them and clean them of weeds as you do these, and destroy the large green worms which feed on them. The plants are to be set about three and a half feet apart.

Cut off the tops of the plants at the height of about three feet, more or less, as they may be more or less thrifty, except those designed for bearing seed, and let these be the largest. The cuting should be done so early as to let the upper leaves acquire a size equal to the lower ones, and let them all be cut off at the same time, whatever the size, in order that good thick leaves may be afforded. Let the suckers which shoot out from the foot of the stalks be also broken or pinched off, as they appear.

The ripeness of tobacco is known by small dusky spots appearing on the leaves, and by their feeling thicker than usual. Then cut them down at the roots, on the morning of a sunny day, and let them lie singly to wither; but be careful not to let them get sunburnt. When withered, lay them in close heaps, under cover, to sweat, for about forty-eight hours or more. After this, hang them up under cover to dry. The way to do this is by runing two stalks on the sharp ends of a stick, and thus suspending them across a pole, at proper distances from each other. As the plants become dry and brown, place them nearer together, when the air is damp, so that the leaves do not crumble. When they have hung till all the greenness has left the leaves, and when they are a little damp, strip them off, pack them in casks, well pressed down, and keep them in a dry place. They will be better for use after the first year.

Mr. *Peters* says, that gypsum is an excelent manure for this plant.

TRANSPLANTING. In performing this operation, on all plants of wood texture, the essential point is to set the roots in the ground in a situation similar to that in which they were placed, before they were taken out; not only the same depth, but, as Mr. *Forsyth* says, with the same side to the south which was the south side before: But as they cannot be got out of the ground, nor set again into it, with their full length of roots, these must be cut off to a length proportionate to their size. Where they are very small, let them be cut at the length of six or eight inches, and where they are pretty large, double that length, or more: Let them be carefully taken up, without breaking the roots, cuting off those that get broken, and cuting them all off at their proper length; and let the hole, into which they are to be set, be sufficiently large to receive the roots without cramping them: Then shake in the earth gently about them, so as that each one shall retain its proper position. As it is difficult to give the fibrous roots their proper place, it is generally best to cut most of these off. In fruit-trees, all the downright roots should also be cut off.

If the roots have been some time out of ground, it is advisable to soak them in water for eight or ten hours before they are set in. In a cold or stiff soil, they should be set shallower than in a warm mellow one. After they are properly beded in the ground, a stake should be drove in near to each one, leaning towards them, and to these they should each be tied, to keep them steady; and some mulch should be laid round the roots of each.

In transplanting the smaller kinds of plants, a wet time is to be chosen, and the evening is better than any other time. As much of the earth should be left round the roots, as possible, in taking them out of the ground; and if they are raised with a little instrument called a Gardener's trowel, by which a bunch of earth can be raised with them, they will be the better for it. The holes where they are set should be well watered, and the water should previously be well warmed by the sun.

For the times of transplanting different plants, and the distances they are to be set apart, *see* the different articles which are the subjects of this operation.

TRENCH-PLOUGHING. Mr. *Peters*, of Pennsylvania, has trench-ploughed as much as fifty acres of his lands, which had become exhausted with croping, and poisoned with weeds, and has always found the operation very beneficial; not only in deriving greater products, from the new layer of earth thus laid uppermost, but in its being free from weeds, and their seeds, which infested the old cultivated stratum. In one instance, he even raised a good crop of hemp on a trench-ploughed soil, and wheat at the rate of more than forty bushels to the acre. Some manure of lime and barn-dung was, however, first applied to the new soil.

After about twelve years, he has again trench-ploughed and turned up the old soil, which he found renovated, and free from the weeds which before infested it. His lands are of the loamy description, which is one of the best kinds for this operation.

The examples of this very intelligent Gentleman, who stands at the head of the Agriculturists of that State, are surely worthy of imitation. It is believed that almost all the old exhausted lands of this Country would, in general, be much altered for the better by trench-ploughing.

It may be a matter of some difficulty to give accurate directions, as to the kinds of soil where trench-ploughing may be pursued to advantage. In some parts of the earth, the stratum below that which has been reached by the plough is at first very sterile, and difficult to be rendered fruitful without the aid of much manures, and long exposure to the sun and frost. If it be a light red sand, or coarse gravel, neither sun nor frost will essentially help it. If it be what is commonly called a *hardpan*, or something similar, it may be found very cold, sour, and unfruitful.

Generally speaking, however, all the better kinds of the loamy lands, whether they be a mere mellow loam, or mixed with suitable proportions of sand, gravel, vegetable, or calcareous earth, and all deep strong clays, deep fertile sandy soils, or intervales, will be found more or less assisted by trench-ploughing, when the upper layer has become exhausted by severe croping; or, in some instances, even when that layer has become contaminated with some of the worst kinds of weeds.

See further, FREEZING.

Another use of trench-ploughing is, to stir up the earth deeper than can well be performed with a single furrow; as, in some particular kinds of culture, this may be found very beneficial.

It is performed by first runing a furrow, with one plough, the usual depth; then another follows, in the same furrow, and throws up the fresh earth over the old, sufficiently deep to bury that below the common depth of ploughing; then the next light furrow, with the first plough, throws the old earth into the bottom of the deep furrow, and this again follows, with the second plough, and throws the new layer on the top of the old, and thus the work proceeds. The Fall is the proper time for performing the operation.

TUMORS. Mr. *Bartlet* directs, that when these appear on the poll, withers, under the jaws, or in the groins of Horses, they should be forwarded by ripening poultices of oatmeal boiled soft in milk, mixed with oil and lard, and applied twice a day, till the matter is perceived to grow soft and move under the fingers; and then it should be let out by a sufficiently large opening with the lancet. Let the opening be full as far as the matter extends. After cleansing the sore, apply pledgits of tow, spread with a salve, or ointment, made of Venice turpentine, beeswax, oil of olives, and yellow rosin; and let these be administered twice a day, if the discharge is great, till a proper digestion takes place, when it should be changed for pledgits spread with the red precipitate ointment, applied in the same manner.

Should the sore not digest, but run a thin water, foment it as often as you dress it, and apply over the dressing a strong beer-poultice, and continue this till the matter grows thick and the sore florid. Should any proud-flesh get into the sore, wash it as often as you dress it with a solution of blue-vitriol in water, or spinkle it with burnt-allum and precipitate. If these should not prove sufficiently powerful, apply caustics, by washing it with a solution of half an ounce of corrosive sublimate in a pint of water. Where the sore can be tightly compressed with a bandage, however, these funguses may be generally prevented.

Tumors, caused by bruises, should, if necessary, be bathed with hot vinegar or verjuice; and then a flannel cloth should be wraped round the part, if it can be done. If this does not abate the swelling, especially if it be in either of the legs, poultice it twice a day, after bathing it with wine-lees, or beer-grounds and oatmeal, or with vinegar, oil, and oatmeal, till the swelling abates; when, in order to disperse it entirely, let it be bathed twice a day with a mixture of two ounces of crude sal ammoniac in a quart of chamber-lie, having rags diped in this and laid on.

Where the extravasated blood is not dispersed by these means, let an opening be made in the skin, and let the blood out, and then heal the wound.

TURNIPS. There are two species of these; the common turnip, or *brassica rapa*, of which there are varieties; and the cabbage-turnip, or *brassica caulorapa*, which is also called the Swedish turnip, or ruta-baga. They are each generally considered in Greatbritain, and elsewhere, as roots of the first importance, in point of profit, for field-culture, for the purpose of feeding and fating cattle. They are not so nourishing, nor so good for feeding Milch-cows, as some other roots; but their abundant yield, and the ease with which they are cultivated, on light soils would seem to entitle them to a preference for cultivation in most cases.

Sandy and sandy-loam soils, where they are sufficiently manured, are considered as best adapted to their growth; but they may be successfully cultivated in any rich, dry, mellow soil. Clays are unsuitable for them. The easterly parts of Virginia and North-carolina offer many millions of acres of soil, admirably calculated for their culture; and perhaps the climate there will be found best adapted for them.

The common white turnips require to be fed out before they grow spongey; but, as ruta-baga are as good for Spring-feed as at any other time, they are well adapted for a supply, after the stock of those first-mentioned are exhausted.

We perceive, by a publication of Mr. *Cobbett*, that, during the last season, he raised six hundred and forty bushels of ruta-baga on an acre of ground, on Longisland, in a soil much exhausted, with the aid of but very little manure; and that he confidently expects to be able to raise eight hundred bushels to the acre, the ensuing season. Some of these turnips, he says, weighed ten pounds, and many of them seven and eight.

The largest growths of them are always the most solid, and best for culinary or other purposes. They may be kept sound and free from that sponginess which soon affects the common white sorts, and for this reason are excelent for taking to sea on long voyages. The nutriment they afford is about the same as that of the others, while fresh; and while either kind remain in this state they are sufficient for the purpose of fating Neat-cattle and Sheep; and, if steam-boiled, Mr. *Cobbett* says, they will faten Swine 'of a good sort.' It is believed that food of every kind, whether for Man or beast, is most nourishing when sufficiently boiled.

See STEAMBOILER.

The culture for both sorts of turnips is the same.

What little has been done in this Country, in raising turnips, has been to sow the seeds in the broadcast way, and mostly on new cleared lands; but often on old ground which had been folded; in which ways tolerable crops are often raised, with but little expense. The crops, in this way of management, may be greatly augmented in product, by going over the ground, once at least, with the hoe, for the purpose of extirpating the weeds, and thining the plants, so as to stand from six to eight inches apart. If the weeds rise again, as they commonly will in old ground, the hoe should be applied the second time.

We shall now proceed to describe the manner of raising these roots in drills, which is the proper method, being that in which the greatest crops may be raised with the least expense.

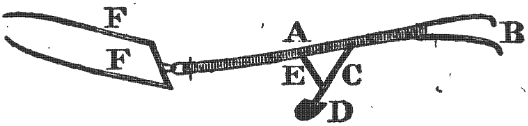
The ground is first to be made fine with the plough; and the richer it is the better; though they may be successfully grown, with the aid of manures, on suitable soils of moderate fertility. Furrows are then to be run at about the distance of twenty-seven inches from the centre of each; and this is best done with a kind of horse-hoe, or scraper, that throws the earth off on both sides, though a common one-horse-plough will answer, by being run back in the same furrow, as described under MANGLE WURTZEL. In the bottoms of these furrows barn-dung, well roted for the purpose, or compost, suitable to the soil, is to be laid evenly along, at the rate of about fifteen horse-cartloads to the acre. A furrow, with a small onehorse-plough, is then to be run on each side of the layers of dung, so as to cover them over, but not too deeply.

By this operation, ridges are thrown up, which are to be the beds for the seed. Over these ridges a small roller is drawn by one Horse, and to this a small drill machine is attached, by a rope or chain, so as to follow behind, one wheel of the drill runing on each side of the ridge, and from this machine the seed is droped, and covered, all at one operation. A handle, extending behind the machine, is held by the Driver, for the purpose of directing it, so as that the seeds are droped in their proper places, over the dung below, into which the roots soon extend, and cause the plants to grow with luxuriance.

In due season, they are to be thined, so as to stand six, eight, or ten inches apart, according to the size they may be expected to grow; which must depend on the dung below, aided by the natural strength of the soil. At the same time, the intervals between the rows are to be ploughed with the scraper, and the hoe applied, together with hand-weeding, for the purpose of cleaning the ground.

In about ten days after this, the second operation of cleaning the ground is to be commenced, by turning the furrows, with the small onehorse-plough, from the rows, which throws the ground into ridges between them; and then with the scraper, to split these ridges, which throws the ground back to the rows again; and this is to be followed with hoeing, and hand-weeding, as before.

The scraper has a share with a wing on each side, and rounded at the point, similar to the round-pointed shovel, and should be nearly the size of one of these. The whole plough, with the share, is shaped thus:



A *The beam of the plough.*
B *The handles.*
C *The chip.*
D *The share.*
E *A brace from the chip to the beam.*
F F *The shafts, to turn on a pivot at the end of the beam.*

The depth of the furrow made by this kind of plough is regulated by the Driver. By pressing down on the handles the share runs deeper, and by raising them it runs shallower. The share should scrape out a furrow about ten inches wide. In hoeing this crop, the essential point is to eradicate the weeds: No earth need be drawn round the plants.

Perhaps a very small harrow might answer, as well as any other implement, for cleaning the ground between the rows, for the first time. It should be about eighteen inches wide, with the teeth set well slanting forward; and it should have a handle, rising up in a slanting direction behind, for the Driver to hold, for the purpose of keeping it at equal distances from the rows of the growing plants on each side.

This harrow may be made so light as to be drawn by hand on the tops of the ridges, in place of the roller, for smoothing their surfaces, so as to fit them for the operation of drilling in the seed; and when the harrow is to be used between the rows it may have a weight put on it, to make the teeth sink sufficiently deep. In such cases, the hand-drill is to be used, in place of the one drawn behind the roller.

Ruta-baga should be sown about three weeks earlier than turnips of the common kind. About the twentieth of May is probably a proper time for sowing the former, in the more northerly parts of this Country; but later, farther south, where the Summers are longer. If turnips of any kind are sown quite early, they are liable to run up to seed in the Fall. Some should be sown early, however, for affording a more early supply for fating cattle.

We have seen a Publication recommending common salt, as an excelent manure for turnips. If this be found correct, the better way would probably be to mix the salt in the heap of compost, or dung, prepared for the purpose of manuring the crop, as before directed. It would be well also to try the effect of gypsum on this crop, by strewing a little along the rows after drilling in the seed.

We should also advise that trial be made of soaking the seed, before sowing, in a solution of saltpetre, with lie of wood-ashes, and old urine, and drying it with gypsum; as something seems neccessary to assist the growth of the young plants, until such time as their roots extend into the manure below.

In gathering this crop, different modes are practised. The Farmers of Norfolk, in England, where the culture of turnips is very extensively pursued, raise the roots with an iron instrument fixed in a handle, and on the other side it has cross edges, which are struck into the root, and cut it into four pieces, which fits it for feeding raw to the cattle. They are then carted into the stubble-field and thrown out for feeding, and at each time a different part of the field is taken for the purpose, in order that every part may be benefited by the manure left by the cattle. After the allowance is eaten, which should be no more than they can eat at once, some hay is given them to correct the superabundant moisture of the turnips.

Others pull up the roots by hand, first twisting them half round, in order to break off the fibrous roots, and rub off the earth adhering to them; and others again pull up one in each hand, and then knock them together, to free them from earthy matter, before they are cut in pieces. It is also directed, by some, that the taproot be cut off, before they are fed out, as this is injurious to cattle, by causing a redundency of bile.

Those which are stored for Winter-use, for cattle, in Greatbritain, have the tops as well as the taproots taken off; but, if either be cut too close, the turnip will be apt to rot. The tops are taken off to prevent vegetation; for this lessens the nutrimental qualities of the roots.

Ruta-baga may be left in the ground for the Spring-supply of food, after the other sort is no longer valuable for that purpose. Some Farmers, in the lower and warmer districts of that Country, leave the Winter-supply in the ground, and take them up as they are wanted; but this, when the ground is frozen, is attended with much trouble in raising them, and some in thawing them, which is done by throwing them into spring water. A considerable loss in the crop is also there incured, when left in the ground; for, by freezing and thawing repeatedly, as they do in that climate, many of them rot before Spring.

Others, for the purpose of preserving them in the field, turn the rows under with a deep furrow run on one side; but this renders them somewhat troublesome to raise again, especially when the ground is frozen; though in this way they are kept sweeter and fresher, than when stored in high heaps, covered with earth and straw, or sometimes with straw only, as is practised in that Country.

In the Spring, or at any time when the ground is sufficiently dry and unfrozen, those turned under with the plough, as just mentioned, might readily be raised with the fork described under POTATOE.

It is probable that the greater warmth of our Summers will afford larger crops of turnips, than can be raised in Greatbritain; and of course render the culture more advantageous; unless the greater severity of the Winters, in the Northern States, should there be found too great a drawback on the profits, by requiring too much expense for the supply during that season. We believe, however, that the expense of storing for the Winter-supply, would be found of no great amount, even where the Winters are long and cold.

In the more southerly States, this expense would be but trifling. In the low lands of North-carolina, for instance, a tract admirably calculated for the turnip-culture, all that would be necessary to be stored of the crop, would be a supply for about five weeks; and farther south still, less would be requisite. We are not particularly informed, however, whether large growths of these plants can be raised much farther to the south; though we believe they may be grown to a good size in almost all the milder climates.

It would be advisable to turn under a small part of the crop of the common turnips, in the manner before mentioned, to be taken up as early in the Spring as the ground should become thawed and rid of the snow, as these would then be fresh for use for some time, and until it was proper to begin upon the crop of ruta-baga, which should last until the season for grass. A part also that is to be stored for Winter, even in the Northern States, may be laid in a high long heap and covered with straw, and some earth upon that, in order to be fed out before the approach of the severer part of the season; as this covering will commonly serve to protect the roots from frost of moderate degree; and if some of them should even get frozen they may be thawed, by being thrown in spring water, without receiving any essential injury from the frost.

Perhaps it might be as well, in our colder climates, to store the whole Winter-supply in this way, and let them become frozen, as they would remain in this state during the cold season, and might be thawed, as they are to be used, in the way just mentioned; the expense of which would be of no great amount. Or the roots might be taken, in their frozen state, and steamboiled, by which operation their nutrimental qualities would be so much improved, as amply to repay this additional expense.

We will now describe a method of constructing an apartment, sufficiently warm, for preserving turnips from freezing in the colder part of the Winter.

For storing two thousand bushels, an apartment would be requisite of about thirty feet long, sixteen wide, and eight in height. To afford a room of these dimensions in its inside, let the building be, say, thirty-three feet long, nineteen wide, with beams across at the height of eight feet from the ground, and above the beams let it be, say, six feet up to the plates. It is to be covered, and enclosed with clapboards in the usual way. The upper part is to be for storing hay; the lower part, for turnips: But, in order to protect them from the frost, it is to be lined with a mass of sandy or other suitable earth, of the thickness of eighteen inches, or less, or more, as the severity of the Winter may require.

This is to be done by seting up studs round the inside, extending from the ground into the beams, enclosing the studs with boards, and filling the space between these and the clapboards with earth, as before mentioned. The hay above is to serve as a protection from that quarter; and a sufficiency of it must be left, until the turnips are fed out. As the earth soon becomes dried, it will do no injury to the timbers of the building.

Another method is, to erect a building for holding hay, or other produce of the kind, with a cellar under it, for storing turnips, and with walls sufficient to keep out the frost. And another is, to lay these roots away in layers of moist sand; that is, first a layer of turnips, then one of sand, and so on alternately, and then cover the outside of the heap sufficiently with sand to keep out the frost. If some nearest the surface become frozen, they are to be thawed, as before mentioned.

In this case, they should be only toped, and laid bottom upwards, the more effectually to prevent their vegetating. The taproots may be taken off as they are used. Laying them down in this manner, though attended with some expense, will serve to keep them in a fresher state, than when laid away without sand, especially if no means be taken to ventilate the heap occasionally. This, however, may be easily effected by tubes laid at the bottom of the heap, at suitable distances from each other, into which fresh air is to be driven, in the manner described for driving water up aqueducts, under MANURES The tubes may be made of narrow strips of boards, with a groove cut in each, and then nailed together; and when thus made they should have a number of small holes bored in them, at proper distances, for leting out the fresh air in every part, which of course expels the foul air from the heap.

'Every Farmer (says a practical Writer on Agriculture, in the new Edinburg Encyclopedia) who wishes to have any of the varieties of turnip of a right kind, ought to save seed for himself. It is unnecessary to expect pure seed from the shops, unless an attention is bestowed in the rearing and wining processes, exceeding what is usually given by those concerned in the processes. Hence heavy losses are often sustained by Cultivators who trust to these Agents; and this has been the case particularly with ruta-baga.

'A few years ago, this excelent root was nearly given up by many Farmers, because a spurious seed was furnished by the shops. However, by the attention of some respectable Agriculturists, seed of a better kind has again been obtained, which may restore the credit of this valuable root. This credit, however, is only to be preserved by a continuance of the same sedulity which caused its renovation; or, in other words, by keeping ruta-baga at a distance from every other species of the turnip and cabbage tribes, when forming its flowers, and procreating its successors.'

A yellow turnip of the common species, which, however, is not the common yellow garden-turnip, has lately been cultivated in England, on account of its being very nutrimental, and capable of being preserved nearly as long as ruta-baga. In growing, it may stand nearer together than the common white turnip, as it does not extend so much in circumference.

Where Sheep are a part of the stock of fating cattle to be fed, during Fall, on the common turnips, a quantity sufficient for them may be left in the ground. Thus, if they are to consume a fourth of the whole crop, leave every fourth row, and by this mean their manure will be distributed more equally over the whole ground. Ruta-baga may also be left in the ground, where Neat-cattle are to feed on them, as the bulb of this root is entirely above ground; and, in such case, what is left by them may be eaten off by Sheep.

It may be advisable for those who undertake the culture of ruta-baga to obtain the best of seed from England, as probably what is to be found in this Country has deteriorated, for want of attention in raising it sufficiently remote from all the other species of Brassica. By importing the seed, the advantage will also be obtained that is common to all change of seeds.

See CHANGE OF SEEDS.

Three pounds of seed to the acre is amply sufficient, for either sort of turnips. It is advisable to give this allowance, in order that if part of the seeds should fail of vegetating, or some of the plants be eaten by insects, there will still be as many left growing as will be wanted. Where considerable fields of turnips are grown, however, there is but little to be feared from insects; for, though they might be sufficiently numerous, when collected on a small patch of turnips, to destroy it; still, when they have several acres to feed upon, their ravages would not so essentially injure the plants, but that enough will remain fit for cultivating.

Where land is naturally rich, or where it has been well manured for a previous crop, turnips may be successfully grown, without manuring them in the drills. A much less quantity of manure, however, will answer when applied in this latter way, than when mixed in the ground; but, if this method be taken, let the barn-dung be carted out in the Spring and mixed in the ground for a crop of potatoes, or Indian corn.

Where land has been previously prepared in the best manner for flax (*see* FLAX) that crop may be first taken; and, if pulled while green, and the ground immediately cleared of the crop, there will be time sufficient for a crop of turnips of the common sort, especially in our more southerly climates; and in such the ground might be cleared of this crop in time to sow it with Winter-wheat.

In raising seed for ruta-baga. we should advise to select a spot for the purpose, sufficiently remote from any place where the seeds of the common turnip or of cabbages are raised: Manure the ground well; mellow it with the plough; then set out good thrifty large roots, taken from ground where they remained during the preceding Winter; let them stand in rows at suitable distances each way, and keep the ground clear of weeds while the plants are growing the seed.

If the stems bearing it are unable to sustain the weight, let them be supported, on each side of the rows, by poles laid on crotched stakes drove into the ground. When the seed-crop has fully ripened, it is to be cut, dried, threshed out, &c. the manner of doing which requires no minute description. A similar method is also to be observed for raising seeds for the common turnip.

We have dwelt thus at length on this article, as well on account of the proper mode of cultivating turnips not being generally understood in this Country, as from a conviction of the importance of their culture being introduced here, as a part of field-husbandry, where the soil is suitable; and we believe that as much as one-half of the lands of the United States are adapted for their growth. Suppose that six hundred bushels to the acre may be the average crop, where they are well cultivated and manured; they are worth twelve and a half cents per bushel, for feeding and fating cattle; the amount of which is seventy-five dollars.

Let us now calculate the expense of raising and gathering an acre:

Three ploughings, and furrowing the ground, 2 days work	$5	
Preparing 15 loads of roten dung, or compost, and laying it in the furrows, say	5	
Covering the manure, rolling, and drilling in the seeds, say	2	
Three pounds of seed		50
Ploughing and hoeing the crop twice, say	5	
Gathering the crop, &c.	5	
Rent of the land	5	
	$27	50

Deduct, say, $2 50, as being the amount of benefit which the next crop will derive from this preparation of the ground, and manuring, and the expense will be $25; giving $50, as the clear profits of the turnip-crop; an amount, we believe, that is not commonly to be equaled by any other crop that is usually cultivated on ground of no greater fertility than is requisite for turnips.

In puting the average amount to be expected from the crop as above, we believe we have not overrated it; as Mr. *Baker*, of Ireland, testifies his having raised forty-seven tons on an acre in that Country. The Irish acre is about one-half larger than the English, or that of this Country.

In preparing a former edition of this Work, we were induced to believe that, in point of profit, carrots were entitled to a preference, in the culture of root-crops. They are certainly more nourishing than turnips; but they are usually less in product, and the expense of their culture is much greater. It would seem that the practical Agriculturists of Greatbritain, where the culture of all sorts of roots has been tried, generally agree in giving a preference to the culture of turnips, where the soil is most suitable for their growth.

But *see* MANGLE-WURTZEL for the greatest product of root-crops, where the soil is adapted to its culture.

We add the following note of Mr. *Melvill*, as communicated to the Society 'for the Promotion of the useful Arts,' in this State. It will be seen that his method of culture is somewhat different from the most approved method in England, as described in this article.

Note on the method of cultivating *Turnips* on the Melvill farm in Berkshire, Massachusetts, and which received the premium from the Massachusetts Agricultural Society, October, 1817.

Persuaded that the opinion prevalent in this part of the country, relative to the cultivation of turnips, was erroneous; that, with not much more labor and expense than for potatoes, *old improved land* could be made to produce, as in Europe, a much greater quantity than in the usual manner of raising them, *on new land recently burnt over*, or on *bog-land;* I determined to appropriate an acre on the farm belonging to my Father, and under my care, to this experiment.

For this purpose, I selected a piece in a lot, which was probably one of the first cleared on the farm, and has certainly been (from what I could learn from the Neighbors) as often under tillage as any other part of it, and quite impoverished: The soil a gravelly loam; in 1813, it was sowed to grain and stocked; in 1814 and 1815 mowed; 1816, half the lot was planted to potatoes, manured in the hill; the other half was continued to grass, and plastered; on the 20th May, 1817, ploughed up of the potatoe-land half an acre, and the same quantity of sward-land, immediately adjoining. In this state it remained till the 20th June, when ploughed it a second time, and formed it into *drills* of twenty-eight inches; the next day carried on fourteen loads of Hog-manure, seven of Sheep do. and seven of common barn-yard do and spread it, immediately, on the top of the drills; and in order to preserve the whole strength of the manure in the soil, as well as to produce quick vegetation, sowed the seed on the manure, and rolled it in the same day. The following day, sowed on the piece thirty bushels slacked lime, and fifteen bushels house-ashes, and, to extend the experiment, divided these top dressings equally on the different kinds of manure (so as to ascertain which manure and which top-dressing was best suited to turnips) left about two square rods without either manure or top-dressing, and marked off three drills not to be hoed at all.

In a few days, had the satisfaction to see that the seed had taken well; that part which had Sheep-manure and ashes appeared the best and most rank; while that without manure could hardly be perceived to have pierced the soil. On the 10th July, harrowed between the drills, with a common corn-harrow, to extirpate weeds and loosen the soil. On the 15th July, examined the field and found no signs of worms; the part with Sheep-manure and ashes continued the most promising; that with Hog-manure and ashes, next. We now hoed out the field (with a small hoe, about five inches wide and four inches deep, well steeled, and sharp on sides and face) so as to leave but one plant in four or five inches of space, as also to take the earth from the remaining plants. After this first hoeing, the drills with Hog-manure and ashes began and continued to take the lead; those with neither manure nor top-dressing, and those not hoed, very diminutive in comparison.

The 20th July, harrowed again between the drills, and the 26th, hoed out the field a second and last time.

The 1st August, began to thin them out by hand (at which time the turnips were in size from two and a half to three and a half inches, except those not manured and those not hoed, both which were quite small) and we thus continued to thin out every few days, to feed to the stock; in this manner, sixty-three bushels were used, previous to the examination of the field, in the first week of October, by Messrs. *Strong* and *Osborn*, for the purpose of ascertaining its produce, which they estimated to be eight hundred bushels.

On the 5th November, began to take in the crop, and we had *twenty-five ox-cartloads*, which we estimated at good thirty bushels each; they weighed about forty pounds the bushel, making at least fifteen tons produced from the acre. The average weight of the turnips is, I think, from four and a half to six pounds; several weighed ten pounds, and one thirteen and a quarter pounds. The expense of cultivation has been, as at foot, seventeen dollars seventy-five cents.

Ploughing, harrowing, and drilling for crop, geting out and spreading manure	$7	50
Seed, and rolling		50
Lime and ashes	4	
Sowing lime and ashes		25
Harrowing between drills twice	1	
Hoeing and clearing, a Man and Boy, twice	4	50
	$17	75

They were harvested and got in, in two days and a half, by a Man and a Boy, with an ox-team.

The satisfactory result of this experiment (entirely novel in this part of the country) may, I hope, induce many of my Brother Farmers to turn at least a small portion of their *old natural grass-land* into turnip-fields. The trial will not require much extra labor or expense, and experience will prove to them that they can, not only keep their stock *cheaper* as well as *better;* but they can raise a much greater number, with a given quantity of land; besides the incalculable advantage of puting land in good heart for grain, especially wheat.

Necessity will ere long oblige us to extend our *green-crops;* for we may be assured that, without them, we can neither keep the land clean nor in good heart; nor can we keep large stocks of cattle to advantage.

THO. MELVILL, jr.

Pittsfield, *Dec*. 18, 1817.

Note. Having seen some Publications of Mr. *Cobbett*, since the foregoing was prepared for the Press, we perceive that Gentleman is decidedly in favor of the cultivation of ruta-baga almost entirely, instead of a culture, in part, of the common turnip; and the reason of his preference of the former seems to be, that he considers it as productive as the latter, more nutricious, and better relished by cattle. We think it probable that by earlier sowing, so as to give it longer time for maturing, it may equal the product of the common sort; and of its superiority, in the two other particulars just mentioned, we have no doubt. The seed of this plant is to be had of the Agent of Mr. *Cobbett*, in the city of Newyork.

Turnips of any sort, when fed to Milch-cows, must always have their tops first taken off, as they impart an unpleasant taste to the milk and butter. The tops may be given to other cattle.

U.

ULCERS. The following are Mr. *Bartlet*'s directions for treating ulcers, in Horses particularly.

The first point is to bring them to discharge a thick matter, which may generally be effected with the green ointment, or that together with precipitate. Should the sore still discharge a thin matter, apply balsam, oil of turpentine, melted down with the common digestive, and the strong-beer poultice over them.

See TUMORS.

The part affected should be well warmed with fomenting, to quicken the circulation, &c. If the lips of the sore grow callous, pare them down with a knife, and rub a little caustic over them.

Where proud-flesh appears, let it be carefully suppressed. If it has sprouted above the surface, pare it down with a knife, and rub the remainder with caustic. To prevent its rising again, sprinkle the sore part with equal parts of burnt-allum and red precipitate; or wash it with sublimate water, and dress it with dry lint, and draw the bandage tightly over the sore; for a tight bandage is the most effectual in dissipating these funguses.

All the sinuses, or cavities, should be laid open, as soon as discovered, after bandages have been ineffectually tried; but where the cavity penetrates deep into the muscles, and a counter-opening is impracticable, or hazardous; or where the integuments of the muscles are constantly driping or melting down; these injections should be used. For this purpose, take of Roman vitriol half an ounce, dissolve it in a pint of water, decant it into another bottle, and add a pint of camphorated spirit of wine, the same quantity of the best vinegar, and two ounces of Egyptiacum. This mixture is also good for ulcerated greasy heels, which it will cleanse and dry.

These cavities sometimes become lined within with a callous substance; and in such case they should be laid open, and the hard substance cut away. Where this cannot be done, scarify them, and apply the precipitate, rubing them now and then with caustic, butter of antimony, or equal parts of quicksilver and aquafortis.

When the bone under the ulcer has become carious, which may be ascertained by probing it, it should be laid bare, in order that the roten part may be removed. In this case, all the loose flesh should be removed, the bone scraped smooth to the sound part, and then dressed with dry lint, or with pledgits diped in the tincture of myrrh, or euphorbium.

Where the cure does not properly succeed, mercurial physic should be given, at proper intervals; and, to correct the blood and juices, the antimonial and alterative powders, with a decoction of guaiacum and limewater, are good.

URINE. *See* MANURES.

V.

VEGETABLE OYSTER. *See* SALSAFY.

VENTILATING OF GRAIN. M. *Duhamel* applied the ventilator to grain, in granaries, with excelent effect in introducing pure air, and expeling the impure, in order to prevent the heating of the grain.

Mr. *Deane* recommends a common hand-bellows, for the purpose of carrying the air from it through a tube to the bottom of the grain, in different parts, and blowing in the pure air, which will of course expel the foul. Perhaps a better plan would be, to have a sufficient number of tubes, with small holes in them at proper distances, laid at the bottoms of bins for holding grain, with one end of each tube projecting out, so that the bellows could be applied to each alternately; as this would be more effectual for the purpose of expeling all the foul air.

The tubes are quickly made of narrow strips of board, by having grooves cut in them, and then nailed together. One end of each tube should be closed.

Grain that is to be sown should be frequently ventilated, if it be requisite to keep it long in a confined place, or it will lose much of its vegetative power.

Where grain is to be kept for some considerable time, it should be thoroughly dried. Mr *Humbert* insists on this, for wheat in particular, not only for preserving it for years, but also for improving the quality of the flour to be made from it. The method recommended by him, for drying it, is to spread it thinly on a floor for the purpose, and stiring it up frequently for a sufficient length of time, which may be three or four weeks, keeping the windows of the apartment open in dry weather, and winnowing the grain, by leting it down from one floor to another exposed to a brisk wind

We believe, however, that it may be as effectually dried in the bins where it is stored, and with very little expense, by ventilating it with heated air.

Under Warming of Rooms, the method of carrying heated air into rooms is described.

All that is necessary for carrying heated air into the bottoms of bins of wheat is, in the first place, to carry this air in a tube from the heating-stove to a vacant place, left for the purpose, which should be central among the bins; and from this tube carry the air, in small ones, into those fixed in the bottoms of the bins, as before described. Thus the heated air would flow from the main tube into the small ones, in every direction, under the grain, and ascend through it, expeling all the moist air, and at the same time drying the grain. In this way, twenty thousand bushels of grain might probably be thoroughly dried in two or three days, with a mere trifle of expense.

VERJUICE. A juice extracted from crabed unripe grapes or apples, too sour for wine or cider. The English crabapple is much used for this purpose.

VETCH (*Vicia*) A kind of pulse, the pods being like those of peas, but smaller, and it is cultivated like field-peas. Some vetches are sown in the Fall, and are called Winter-vetches; and others in the Spring, and are called Spring-vetches. They do not essentially exhaust the soil; and therefore Mr. *Livingston* supposed that the Spring-vetches might be valuable to be sown on Summer-fallows, to precede a crop of wheat. He accordingly made two trials of them, the seed being brought from England; but the results of these not being perfectly satisfactory, particularly in the product of seed, there is reason to believe, that the culture was not such as it ought to be. The produce of his best experiment was at the rate of about twenty-five hundred weight to the acre. 'The fodder (he says) appeared to be remarkably succulent, and extremely well calculated for Cows and Sheep' He is, however, of opinion, that the cause of his failing in the requisite quantity of seed, which in England is twenty-five or thirty bushels to the acre, was owing to sowing too thick (three bushels to the acre) and to manuring with gypsum, which he supposes makes the plant run more to haulm than it otherwise would do.

Probably this plant, when the seeds are imported, requires a naturalization to the soil. At all events, if a ton and a quarter of this fodder could be raised to the acre, as a Summer-fallowing crop, together with a due proportion of seed, the culture of it would be tolerably advantageous, by making this the intermediate crop between the breaking up of sward-land and a crop of wheat, as only one ploughing is requisite, after taking off this crop, for sowing the ground with wheat.

Vetches which are sown in the Fall are used in the Spring for feeding Sheep and other cattle: They may afterwards be mowed for fodder; and it is said they may be mowed twice a year in warm climates. Mr. *Livingston* mowed the crop, which grew best, about the 20th of August.

There are different kinds of this plant, and perhaps each kind may not be equally well-suited to our climate. Probably, if further trials were made of this plant, results of a more favorable nature might be obtained.

VINE *(Vitis)* AND VINEYARD. Wherever any kinds of grapes grow wild, they may be there cultivated to advantage for making wines, and may be habituated to a colder climate. In the more southerly parts of this State, there are two species of grapes, of which there are varieties; the black-grape, *vitis labrusca*, and the foxgrape, *vitis vulpina.* In the more southerly climates, particularly on the waters of the Ohio and Mississippi, there are much greater varieties of these grapes.

For garden-grapes, Mr. *Forsyth* selects the *white muscadine*, or *chasselas*, which is a great bearer; the *white sweet-water*, which is very fine-tasted, and ripens in September; the *black sweet-water*, which also ripens early; the *large black-cluster*, which is harsh-tasted, being that of which the Oporto wine is made; and the *small black-cluster*, which is pleasant-tasted.

The spots most favorable for vineyards are the sides of hills or mountains, descending southwardly, or to the east; but to the south is best; and let the soil be loose and mellow, but not liable to be much washed by heavy rains. Stiff soils are not good; though by carting on much sand, and other loosening manures, they will answer tolerably well. The ground must be well mellowed by ploughings, and mixed with sand, if not naturally sandy, and such manures as will serve to make it rich and keep it mellow. Where the hill sides are steep (and such produce the best vines) it is advisable to cart on stones of small and middling size to mix with the soil, which help to keep it moist and warm; and a part of them are to be laid along in ridges on the lower side of each row of vines, to keep the earth from washing away. Round the vineyard let a good substantial fence be made, which will keep out both Men and beasts. The northerly side of the vineyard should be well protected from the northerly winds.

For a selection of vines for planting, Mr *Johnson* recommends the following, as being hardy and best-suited to more northerly climates. The *black Auvernat;* the *black Orleans;* the *blue-cluster;* the *miller grape* (these make the best Burgundy) the *black Hamburg;* the *red Hamburg;* the *white Muscadin;* the *Muscadella;* the *melie blanc;* the *white Morillon;* the *white Auvernat;* and the *gray Auvernat.*

The seven following kinds also ripen in September; but are not quite so hardy, and should therefore occupy the warmer parts of the vineyard, or be planted in more southerly climates: The *Chasselas blanc*, or *royal Muscadine;* the *Malvois*, or *Malmsey;* the *gray Frontinac;* the *red Frontinac;* the *black Lisbon*, the *white Lisbon;* and the *Chasselas Noir.*

In addition to these kinds, let the fox and the black-grape, before mentioned, as being indigenous, be also added to the list; the former of which is probably inferior to none of them.

The next point is to select branches for the cutings with which to plant the vineyard. These are to be taken from the *bearing* part of the vines; and among these, such as are short-jointed, from which you may expect vines which will be thrifty and fruitful. They should be sound, of a healthy appearance, thick-set with eyes, and the nearer the last year's growth the better. Let them be cut close to the old wood, where they will be more firm; and they are not to be cut to their proper length, which is about five inches, until you are about to plant them in the vineyard. Good branches, of the length of three feet, may afford four or five cutings; though those which are nearest to the old wood are esteemed the best.

Some cut off the branches, to be used for cutings, in October; and others again, in March or April. If at the latter times, they are to be planted in April or May; and the next Winter they must be secured from the frost by course litter piled up round them; which, in the Spring following, may be strewed over the ground for manure. If the cutings be planted in the Fall, they are be in the same manner preserved from the Winter-frost: One method is also to set them out closely in the Fall, in some warm dry spot, in a trench about a foot wide, which should be well prepared by diging, and over them erect a roof made of straw, well secured, to keep of the frost, and the heads of the branches to be kept in an upright position, by poles or laths surrounding them for that purpose, in order to prevent their lying on the ground, and thus becoming mouldy.

In planting the cutings in the vineyard, after the ground has been well prepared, as before directed, let the thick ends be cut off square with a sharp knife, and the upper ends obliquely, about half an inch above the eye. Plant them at the distance of about eight or ten feet each way, and let the earth be pressed round them with the foot. They are to be set in an inclined position, leaving the upper bud or eye nearly as low as the surface of the soil, and be careful not to injure the eye in treading the earth about it. In the Spring, while nightly frost prevails, let this bud, or eye, be slightly covered with earth in the evening, to save it from the frost, and again uncovered in the morning.

Remember to drive in the stake, on which the shoot is to be trained, at the north side, so as to give the shoot all the warmth of the sun. When the shoots begin to put forth, for some will rise from under ground, let them all grow for a certain time, in order that you may have an opportunity of determining which is likely to be the best; and these are the roundest, shortest-jointed, and the most thick-set with eyes. Those which grow long and spindly, with few eyes, are not good. When you have thus selected the best, pinch off all the rest; for all the nourishment which the roots can afford is requisite for its growth. As it advances in growth, fasten it to the sunny side of the stake, so that it be not beaten about with the winds, and pinch off its tendrils, laterals, nephews, and suckers; not closely, however, but at some little distance from the body of the main shoot.

This shoot may rise to the height of eight or ten feet in a Summer, if left to grow its full length; but its growth must be checked at the height of not more than four feet; otherwise its strength becomes exhausted in the production of waste wood, and the head becomes feeble, and incapable of bearing the lateral branches, which it is destined to support.

October, or rather when the leaf begins to fall off, is the time for triming; and then the branch should be cut down to two *good* eyes, not reckoning the lowermost next the old wood, which is called the dead eye; or several eyes may be left, which, during the next Spring, will furnish a number of sprouts, and from these select the *two* best.

The vine being thus pruned, some direct to open the ground round the roots, to the depth of three or four inches, and to cut away the roots to that depth; not closely, however; and let this be repeated for the first three years; the use of which is to make the vine take deeper root, which it is said makes them more durable, fruitful, and less liable to be injured by droughts.

No particular notice is here taken of the method spoken of by Mr. *Johnson*, of bending the vines down to the ground at the approach of each Winter, during the first three Winters, and covering them slightly with earth, to protect them from frost; because it is not believed that this process is requisite. If it be found so, the *head* must not be covered with earth, but with chaff, or some such dry stuff, to keep it cool and dry.

The second year's growth should only exhibit two branches trained. The good eyes will all shoot forth in the Spring; and let them all grow to the length of about eight inches, before you select the *two* most proper. These should have the characteristics already described, as necessary for the best branch of the first year's growth. Check the branches of the second year's growth at about five feet, pinching off the laterals, &c. at about four inches, as before directed. In the Fall, when the leaves begin to drop, trim the vines, again, as before. Now you have two main branches to trim, and these should be cut down to within four or five good eyes of last year's wood, dealing with the upper roots as before, and burying the vines during Winter, as before mentioned, if this be found necessary.

The third year presents two main branches, each furnished with four or five eyes. Proceed as before in the choice of shoots to be reserved, training only two from each branch: Thus you will have four main branches this year. If you find your vines begin to bear this year, pluck off nearly all the clusters while young; for, by too early bearing, the vines become debilitated, and materially injured for bearing afterwards.

With respect to croping and pruning the vine, be always careful to check its aspiring nature, and keep it of humble size, by which means it is always easy to be managed by manual labor, and less subject to be injured by the violence of winds.

In the fourth year, training again two branches from each trained branch of the previous year, you will have eight branches to each vine. You, therefore, proceed as before in humbling the vine, and proportioning its quantity of fruit to its ability to bear; and remember not to let the vines bear all the fruit they put forth; until they are fully able to do it, without injury to them afterwards.

All this time, the ground of the vineyard is constantly to be kept light and mellow, and perfectly clear of weeds and grass. For this purpose, straw, chaff, flax-shives, and every thing of the kind is to be carried on, and spread over the ground, to keep it mellow and moist, and to prevent its washing. Observing this the first four years, greatly forwards the vines, and at the same time prepares them for good crops afterwards; nor should the practice be afterwards wholly discontinued.

In planting a vineyard, it is also requisite to have a nursery of the vines at the same time, to supply those which may die when planted out. The ground of the nursery should not be so rich as that of the vineyard; it should be kept clear of weeds and well hoed; and it should be planted pretty thickly, in order that the roots do not extend too much.

A vineyard of an acre should contain but two sorts of grapes, and one of two acres should not generally contain more than four sorts. Every kind of grape should be made into wine by itself, and not mixed with others.

The vine, where the climate and soil is most suitable, will grow to a prodigious size, and live a surprising length of years. *Strabo* speaks of a vine which was twelve feet in circumference; and *Pliny* also mentions one which was six hundred years old! In the western parts of this State, and elsewhere in that direction, I have seen them, where, from the size of the trees on which they were supported, and they must have grown up with the trees, they could not be less than a hundred years old.

Mr. *Johnson* observes, that, from the prices which grapes have been sold for in our largest cities, the income of an acre of vineyard would amount to six hundred dollars; but, perhaps, this calculation is rather too large. Be this as it may, it is certain that their cultivation, whether they are to be made into wine, or to be picked, and sent into our cities, or elsewhere, for sale, must undoubtedly be profitable.

The method of preserving grapes to send abroad, is to pack them up in dry saw-dust or bran; and in that situation they may be exported, if they should not be wanted at home, with the same facility and safety that they are at present sent from other Countries into this, for sale. Probably they ought to be put up a little before they are fully ripe.

In Albany and Newyork, they sell for as much, upon an average, as twenty-five cents per pound.

The foregoing is mostly an abridgment of Mr. *Johnson*, on the culture of the vine, and very nearly agrees with Mr. *Winterbotham* on the same subject. Mr. *Forsyth* describes a new method of training the vines, for wall or garden-fruit; but this does not seem applicable to the vineyard. His method is exhibited in his drawings, which are well worthy of examination. Other essays on this culture may also be worthy of examination; such as those of *Speechley*. *Miller*, *Antill*, and that contained in the Encyclopędia; and even the song of the first of Roman Poets on the subject, if it should not afford additional instruction, may nevertheless be found possessed of charms which may more strongly incline the Man of taste to the industrious culture of the vine.

For the method of making the wine, *see* WINE.

Mr. *Livingston*, in describing the beautiful country which lies upon the Loire, between Nantz and Orleans, in France, notices 'the farm-houses surrounded by gardens filled with fruit-trees, with vines, trained up the trees, and extended from one to the other. Every house, he says, is also covered with a large grape-vine, at least on three sides.' This practice he very justly recommends for Farmers, as being highly ornamental to small houses, useful as it regards health, convenient for shade; while the fruit, though not intended for wine, might be made a source of family comfort and enjoyment. He observes, too, that the earth round dwellings is always rich and warm; and therefore well adapted to the grape.

VINEGAR. The method of making this liquid out of cider, wine, &c. is too generally known to need any description; but it is not so generally known that a very sharp vinegar may also be made out of whey. The method of making it, as described by Mr. *Genet*, is very simple.

'After having clarified the whey, it is poured into casks with some aromatic plants, or elder-blossoms, as suits the fancy, and exposed in open air to the sun, where it soon acquires an uncommon degree of acidity.'

Vinegar may also be made from the juice of elder-berries, mixed with a suitable proportion of water, and exposed to the sun, as before mentioned. It may also be made from the juice of the black-birch, or of the maple, when either is boiled down sufficiently; or from the juice of beets, carrots, turnips, potatoes, &c. when boiled and the juice pressed out, and exposed in like manner.

VIVES. A swelling, says Mr. *Bartlet*, of the kernels under the ears of a Horse, being the part first affected.

They seldom come to matter, but perspire off, if warm clothing, anointing with marshmallow ointment, and a moderate bleeding or two be applied. But, should the inflammation continue, notwithstanding these means, a suppuration should be promoted. For this purpose, make an ointment of an ounce of mercury and half an ounce of Venice turpentine, pounded together till the mercury is no longer visible; then add to it two ounces of hogslard, and anoint the swellings with this till a suppuration takes place.

For destroying proud-flesh in the sore, *see* Ulcers.

Mr. *Bartlet* says, When these swellings appear in an old Horse they are signs of great malignity, and often of an inward decay, as well as foreruners of the glanders. He also says, In young Horses they are critical, and should be managed as above, instead of applying the above ointment at first to disperse the swellings; as in that case there is danger that the disease may be thrown on the lungs, or into the thick flesh of the hinder parts of the Horse, where they will form deep imposthumes, and sometimes kill him.

W.

WAGON. *See* Carriages.

WALLS. Stone-walls, for fences, have already been spoken of.

See Stones.

The cellar-walls of a house should be laid with stone and lime; not only for standing more firmly and a greater length of time, but also to keep out the frost. If they be not thus laid, it generally becomes necessary to bank up the outsides with Horse-dung, or something that will keep out the frost, which tends to rot the sills, and at the same time has a very mean appearance.

The stone-walls of many ancient castles and other buildings, in Europe, are principally held together, not by binding, as is now practised, but by the force of cement. This cement, it is believed, is nothing more than a due proportion of sand and lime, made very thin with water, and poured into the middle of the wall; not merely plaistering in among the stones, as is done at present. The advantage of this method is, that the lime being so plentifully mixed with water, and for such a length of time before it evaporates, has sufficient time in part to dissolve and be again crystalized; and, in crystalizing, it adheres to the stones, and thus forms a solid mass. The wall must be saturated with this cement. Even pebble stones may be thus cemented together in a wall; provided they be kept in their places, and the mortar be kept from runing out through them till it has become hardened.

The due proportions of lime and sand, for making the strongest cement, must, however, be previously ascertained by experiments made for the purpose; as the proportion of each depends on the quality of each; that is, if the lime have but little of other earthy matter in it, the less of it will answer; and the more sharp and gritty the sand, the less lime will be requisite.

Mr. *Livingston* mentions the houses built of earth in the neighborhood of Lyons, in France, which are well worthy of attention, as a matter of economy. They are built two and three stories high, and many of them have stood a century. The earth used for building them is a gravelly loam. A clay or a sand will not answer, but almost every other earth will. The earth is pounded hard with sharp-edged beetles, being put in frames made for the purpose, so as to give the masses a square shape proper for being laid up in the wall. These walls are sometimes plaistered on the outside, but will answer well without. The barns, and garden-walls there, are built of the same material. Columns are also formed of the earth, in the same manner, in moulds made for the purpose. 'The extreme cheapness of these buildings (says Mr. *Livingston*) the facility with which they are made, their warmth, their security against fires, recommend them so strongly, that I shall make myself complete master of the art before I come over, and teach it to my Countrymen.' It is to be hoped that a design so patriotic has not been frustrated, and that its execution may be duly appreciated.

WALNUT. There are but four species of this tree, in this Country, which are indigenous. The enumeration of these, by Mr. *De Witt*, which it is believed is the only correct one, is as follows: The black-walnut *(Juglans nigra)* the butternut *(Juglans cinerea)* the Illinois-nut *(Juglans olivae formis)* of each of which there are no varieties, and the hickory-nut *(Juglans alba)* of which there are several varieties; such as the shagbark, the smoothbark, &c.

The nuts of the three first-mentioned, and of the shagbark, are good; some of those of the varieties of the smoothbark are tolerable, and some are bitter. The natural growth of the three first-mentioned indicates a dark-colored, fertile soil; that of the shagbark, one inclining to clay; and the smoothbarked varieties commonly grow on warm gravelly loams, or other dry loamy, or sandy-loam soils.

Mr. *Forsyth* makes mention of fifty walnut-trees, in England, being rented for fifty pounds sterling a year; and that the Lessee cleared that amount from them, after paying the rent. Most probably, these were the shagbark walnut. He directs that walnut-trees should be raised from the nut, when fully ripe; that they will be fit to transplant the first Autumn after sowing; when they are to be put into beds, and transplanted every second year, until they are large enough to set out where they are to grow.

Which management, he says, causes them to throw out fine horizontal shoots, and brings them to a bearing state much sooner, than when they make deep tap-roots; that, when they are large enough to be trimed up to the height of seven feet, they should be set out in the orchard, at the distance of about six feet apart; and, as they grow larger, those found to be the best bearers are to be preserved, and the rest cut away. In triming the trees, his composition is to be applied (*see* FRUIT-TREES) and, previous to seting them out, he directs that the ground should be trench-ploughed.

See TRENCH-PLOUGHING.

The shagbark walnut only is cultivated in England, and this tree is no doubt the most valuable for its fruit, as it is a more plentiful bearer than any other. Such land as that on which it naturally grows is probably best for its cultivation.

WARMING OF ROOMS, &c. As it is essential to make a little fuel answer for this purpose, as well as for boiling, baking, roasting, &c. we will here describe a cheap and simple method for all these purposes; leaving every one to vary from it, by the use of stoves, or otherwise, as he may think proper.

Make, of sheet-iron, something in the shape of a potash kettle, but not near so deep in proportion to its breadth on the rim, and let it be, say, two and a half feet in diameter across the rim; set it, bottom upward, on brick-work suitable to the dimensions of the rim, about ten inches high, leaving a place to fix an iron door, like the door of a common stove: Build a brick wall all round and over this, leaving a space between it and the sheet-iron, of about two inches, and an opening where the door, just mentioned, is placed. Apertures are to be left in this outer wall, for inserting tubes for carrying off the air that is heated, between the outer wall and the sheet-iron, into different apartments.

When a fire is made within the part covered by the sheet-iron, the air between that and the outer wall becomes rarified, and of course ascends through the tubes into the different apartments or rooms, while the fresh air is constantly rushing in to supply its place. Thus, while a constant current of cold air is rushing in below, a like current of warm air is carried off into the apartments where it is wanted. When any one of these is sufficiently filled with warm air, the tubes leading into it are to be stoped in part, or wholly, till more heated air is wanted. It would be most advisable to let the heated air into each room in different places, in order to distribute it more equally.

In a room warmed in the usual way, about two-thirds of the whole heat of the fire passes out of the chimney. In the mean time, all the air in the room will also have passed off in that direction in less than an hour, and of course cold air must rush in to supply its place. Thus the whole air of such room has to be heated over again once an hour, and this is to be done with only a third of the heat afforded by the fire. Now, according to the plan here recommended, the air in a room would require a degree of heat equal to warming the whole over again, about once in six hours, as the heated air is not to be allowed to pass off out of a chimney; and for this purpose of heating, at least two-thirds of the heat of a smaller fire can be applied. Thus a room, to be warmed in the common way, requires a fire which gives twelve times the quantity of heat that is required in the method above described.

This heating-stove may be set in the kitchen; but a cellar-kitchen, or one lower than the dwelling-rooms, would be best. It may also be set in a small building adjoining the house; but let it be set lower than the rooms of the house.

But, in order to render this complete, let the steam-cooking, baking, and roasting apparatus be attached to it. For this purpose, let the smoke, and the heat that goes with it, pass out through a hole about four inches square, made in the side of the sheet-iron, opposite the door; and let it be carried in a zigzag manner, back and forward, under the bottom of a boiler, made of sheet-iron, and this will sufficiently heat the water in that to afford the requisite degree of steam for the vessels used for cooking by steam, as well as for heating water in adjoining wooden vessels of different sizes, to be used for different purposes. The pipe conducting off the smoke, &c. after having passed under every part of the bottom of the boiler, is then to be carried upwards, and pass round three sides of a small oven, made of sheet-iron, which is to be used for baking and roasting. The outside of the smoke-pipe, and of the door of the oven, should be thickly coated with powdered charcoal, in order to prevent the heat passing off through the exterior surface, until it shall have ascended above the oven.

Thus, with one-half of the fuel used in a kitchen fireplace, every room, in a house of moderate size, may be warmed; all the culinary business may be performed; roots may be boiled for cattle in large vessels made for the purpose; and all this may be performed without half the risk from fires which attends the usual methods.

For close-stoves to be set in rooms, it is believed, that the Russian stoves will be found preferable to those made of iron. They are built of brick, and may be made of different forms. They should be supplied with air from without the room they are intended to warm; as this will be a great saving of the heated air in the room. They are used entirely in Russia, and they require less fuel than our iron stoves, as two cords of good wood will supply one of them a whole Winter. Cooking may also be done in them, as in our iron stoves, by having an oven fixed in them for the purpose.

WATER. This is found, by chemical experiments, to be the same substance as air, but in a more condensed form; being composed of about eighty-five parts of oxygene, and fifteen parts of hydrogene, gas.

See AIR.

This substance, however, in its condensed and in its gaseous state, is the essential food of plants; as no vegetation can be produced without air, nor without water; but, with these alone, every species of plant can be made to vegetate to a certain degree.

It is, however, unnecessary to dwell minutely on this article; but something should be said of its application to meadow-lands; of drawing it off, where too abundant; and of applying it to plants.

Where water can be carried over lands, without too great an expense, it should always be attended to, as great crops of hay may be had from such grounds. The means of watering the ground, or of taking it off, should be completely under control; for, if too much be suffered to run on, it may do more hurt than good. Chalybeate waters, and such as are impregnated with mineral acids, should be avoided. That which has a rich sediment is best. The quantity should be proportioned to the nature of the soil; as sandy grounds require more, and stiff soils less. The channels should be so made as to carry the water to every part, except where the ground is naturally wet. The main channel should just have descent enough to cause the water to run; and the lateral branches should be run in such directions as that the descent be very moderate, and at the same time convey the water to every part of the ground. Sometimes it is necessary to carry off the surplus water by other channels, where the ground has little hollows runing through it.

When the weather is hot, the water should be taken off the ground. The night, and days which are cool and cloudy, are the best times for applying it.

In the Spring, it should not be applied till the ground is somewhat dry; and after the grass begins to start let the quantity be diminished, and let it also be stoped during rainy weather. When the grass is pretty well grown, no water should be applied, except in cases of drought. After taking off the second crop, the water may be thrown on more plentifully; but it must be taken off some time before the Winter-frost commences.

The foregoing is believed to be the most suitable directions for watering meadows, as practised in this Country; but this falls far short of the most approved practice in Greatbritain. There the spots selected for the purpose are so nearly level, after the ground has received its proper shape, that the water, which is let in at one side, will but barely run off at the other. The ground is shaped exactly for the purpose, by raising it were it is too low, and sinking it where it is too high; it is then made into ridges about nine yards wide, and a foot in height, with an uniform descent from the middle of each to the extremes; a shallow channel is then made on the highest part of each ridge for conducting the water on them, and another on the lowest ground between them for carrying it off A canal is made on the upper side of the piece of ground for supplying the water, and another on the lower side for carrying it off, after it has served the purpose of irrigation. Thus the water is let out of the upper canal into the channels made on the higher parts of the ridges, which channels it fills, and overflows just enough to impart a due proportion of water to each ridge; and thus gently overflowing spreads over the surface, till it is received in the lower channels, and by them is carried into the lower canal, and thence carried off.

It will readily be seen, that no water should be suffered to run off into the lower canal from the channels which carry it on the heights of the ridges. The channels should be stoped at their lower ends. The water in the upper canal should be under perfect control; so that no more than is necessary be let into the higher channels, and that it may be taken off at pleasure. Where the supply of water is small, a part of the meadow may be irrigated at a time, and part at another, in succession, till each part has, in turn, been duly supplied. This is to be done by flood-gates, to confine the water in the upper canal to the parts where it is required.

The upper canal is to be supplied from a durable stream, and the more turbid this is, the better. Clear limpid streams are by no means so good for the purpose.

This method of irrigation is a beautiful and ingenious part of husbandry; and seeing that it has been so successfully practised in England, it would be desirable that trials of it should be made here; as in many spots it might be found very profitable.

For raising water to irrigate lands, which are above its level, different kinds of wheels may be used, which are so well known as to render a description of them unnecessary. The method of raising water by the force of wind, in the manner it is raised out of the dykes in Holland, may also be resorted to, if it be found that the profits will warrant the expense. The Reader will find, in *Darwin's Phitologia*, a description of a very cheap wind-machine for raising water, which probably might be in some places applied to advantage, but most particularly in raising water from wells, for supplying cattle with drink.

Water-furrowing lands which are wet, when sown with Summer-grain, is of great importance in carrying off the surplus water; and the furrows should be made deep, and cleared out with a shovel, and carried in such a direction as will cause the ground to be the least gullied by heavy showers. The same may be said of grounds sown with Winter-grain; but wet grounds, particularly if they lie flat, should never be applied to this use; for, if the ground be ever so well water-furrowed, the furrows usually become so filled with ice as to render them useless. Grounds, however, of moderate descent may be thrown up into high ridges, so as to answer tolerably well, in most Winters, for winter-grain; but, if they be somewhat steep, this management usually proves injurious by the washings of heavy rains. Rather let such grounds be hollow-drained, and then neither ridging nor water-furrowing will be necessary.

With regard to watering of plants, all that is necessary to be said, is, that cold water, as drawn from wells, should never be applied to them. The water should be exposed to the sun for such time as will render it as warm as rain-water; and the quantity applied at once should never be very great; but rather like the application of a gentle rain.

WATER-CHESNUT. This tree is called *Lin-kio* in China, where it is cultivated for its fruit, which has a cooling and agreeable taste. It is sometimes sold in that Country, like filberts, in a green state; sometimes it is dried, powdered, and made into soup, or baked, with a proportion of sugar and honey.

All that is necessary, for propagating and raising the tree, is to throw the seeds into the shallowest parts of ponds, and rivers, which have a southern exposure, as such are the natural places for its growth. The seeds are sown in the latter part of Autumn.

As this tree is grown on lands which are otherwise totally unproductive, it would most probably be found a valuable addition to the catalogue of plants, proper to be cultivated in this Country.

WATER-LILLY, or China (*Nelumbium.*) This plant is called *Lien-wha*, by the Chinese, and its root is said to be the most valuable of any known, where suitable grounds can be had for its culture. It is only proper to be grown in marshes. In such grounds, it grows to the length of fifteen feet, and of the thickness of a Man's arm. The outside is white, and the inside yellow. It is an excelent vegetable for the table. The Chinese pretend that it yields the liquor of immortality.

It is said not to grow successfully in Europe; but that part of the world is dissimilar in climate to China. The climate of this Country is similar to that of the latter Country, though perhaps a little colder in the same degrees of latitude. It might be of essential service to this Country to have the seeds of the plant brought thence, to be sown as well in our lands which are naturally marshy, as in those which might be rendered so by flooding; as, what might not be needed of the root, for culinary purposes, would be useful for feeding and fating cattle. The plant is readily cultivated in China, by merely sowing the seeds in grounds suitable to its growth.

WEEDS. Generally speaking, most of those which are difficult to exturpate, by common culture, will be found to yield to constant yearly crops of such plants as grow very high and very closely. For this purpose, several crops of hemp in succession would no doubt be found sufficient to eradicate almost any weed. The tall oatsgrass, and some other grasses which grow very high and thick, would also be found very useful for this purpose.

See Grasses.

Crops of carrots and other roots, which require close weeding, would also be found excelent in eradicating some weeds. It is also believed, that planting grounds with potatoes, after the Irish method, will be found sufficient to smother almost every kind of weed.

See Potatoe.

Something shall now be separately said of some of those weeds which are most formidable to the Farmer.

The *Canada thistle* (*Cnicus Arvensis*) flourishes in close and stiff soils: In those which are dry and gravelly, or sandy, it does not prevail. It is extremely injurious in all

tillage. In lands, however, which have been closely pastured for a number of successive years, it will nearly disappear; and in mowing-lands, its growth will be constantly retarded, and lessened, where the grasses grow luxuriantly, particularly those before mentioned. It is, however, but little injurious in hay, as cattle eat it freely; and they are particularly fond of it, when it has wilted, after being newly mown. In soiling of cattle, it would, therefore, be of no essential injury; while it would gradually give place to the tall and luxuriant growth of grasses, used for that purpose.
See SOILING.

Pasturing, cultivating tall grasses, and keeping the lands highly manured, will probably, in general, be found the most effectual methods of geting rid of this thistle, unless the culture of potatoes, before mentioned, should be found sufficient to destroy it. On dry loams, however, or those laid dry by hollow drains, or on some dry marly soils, the yearly culture of hemp might, in many instances, be profitably used in subduing this troublesome weed.

By a communication of Mr. *De Witt* to the 'Society for the Promotion of the useful Arts,' in this State, it appears that covering this weed, to the depth of five or six inches, with straw, will completely extirpate it. In the trials which were made, for this purpose, the straw was laid on when the thistles had grown to the height of six inches, and was left upon them for a twelvemonth.

'It is of the utmost importance (says Mr. *De Witt*) in the newly-cultivated parts of our Country, to attend to the early destruction of this troublesome weed. It generally appears first in small spots, and if not extirpated will rapidly spread, by means of its almost indestructible roots, even should it be prevented, by timely excision, from sending its winged seeds abroad, till it covers fields to an extent which will discourage attempts to destroy it. I have seen several spots, far remote from where it prevails, that were at first but a few feet in extent, and which have annually increased, till they have become of a formidable size.'

It may be further observed, of this weed, as of all others, that constantly pulling it up, as often as it appears above ground, will subdue it. The leaves of plants, in particular, are analagous to the lungs of animals. It is principally through the leaves that hydrogene is absorbed, and oxygene is emited.
See AIR.

Any plant, therefore, when long divested of its leaves, or of its stalk, if it bear no leaves, must eventually perish. The roots alone cannot long exist. All, therefore, that is necessary for extirpating any weed, is to keep all that grows above ground constantly cut or pulled off; and the more frequently this is repeated, the sooner will the roots loose all further vegetative power. The roots of this thistle are difficult to subdue in this way; but perseverance will ultimately accomplish their destruction. It is almost useless to add, that he who operates upon this weed, must provide himself with a thick pair of leather gloves for the purpose.

The *common thistle (carduus)* is easily destroyed by mowing it when in blossom, or by pulling or diging it up in the Spring.

The *yellowweed (ranunculus)* prevails mostly in wetish meadows, where it roots out most of the grass. It is, however, highly relished by cattle in fodder; though its product will be found small, compared with that of the grasses which before filled its place. When eaten green, it is hot and acrid, and cattle do not much relish it.

Hollow draining wet lands, and manuring, and cultivating them with tall grasses, or in some of the methods before mentioned, which may be most suitable to the soil, will quickly extirpate this weed.

The *whiteweed*, *Mayweed*, or *oxeye (chrysanthemum)* roots out the grasses in pastures and mowing-lands, where the ground is not very strong; but where it is well enriched with suitable manures, it gives way to the grasses in turn. It never makes its appearance in a very strong tough sward. Cattle will eat it in hay, if it be cut green, and well made; but they dislike it in pastures; and at best, its product is but small.

To extirpate this weed, manure the land strongly, and cultivate it yearly with carrots, hemp, or tall grasses, as may be most suitable to the soil. Common hoed crops, when yearly repeated, will also subdue it. But where it grows in moist meadows, which are not intended to be hollow-drained, the best means of destroying it are frequent top-dressings of composts suitable to the soil (*see* MANURES) or pulling it up by hand, which should be done when it is in blossom.

The *daisy* prevails mostly in upland-pastures; and sometimes, where the soil is not strong, it chokes the crops of wheat, flax, &c. It may be destroyed by yearly hoed crops, by hemp, tall grasses, &c.

The *wild-onion (allium canadense)* prevails most in Pennsylvania, where it was brought by the Swedes, and used for pasture. It is very injurious in crops of wheat, and by no means inoffensive in those of rye. It is also bad food for Milch-cows, as it imparts its taste to their milk, butter, and cheese. Yearly hoed crops, hemp, and tall grasses will gradually subdue it. Frequent ploughings and harrowings, when the ground is dry, is also beneficial. Let the Irish method of planting potatoes be also tried.

The method commonly used in Pennsylvania, for thining this weed, is one or two hoed crops, and then oats sowed thickly. Long pasturing or mowing the ground, will tend gradually to extirpate it; especially if the growth of the grass be luxuriant.

A Writer in a Paper, published at Raleigh, North-carolina, says, that late in August he turned under a sward, to the depth of about four inches, which was much infested with wild-onions; that, in the Fall following, he sowed and harrowed in wheat on the ground, without any further ploughing; and that the crop was entirely clear of these weeds. In this case, it would seem, that turning under the roots of the onions to this depth, and leaving them thus inverted, is sufficient to destroy their vegetative powers; and, if so, the turning under of a clover-sward, to form a lay for wheat, would seem to be admirably calculated for extirpating their growth.

See CLOVER and TRENCH-PLOUGHING.

The growth of weeds which are commonly called *cockle* and *steencrite*, is often injurious to crops of wheat and rye. The seeds of these weeds are usually carried into the fields in the barn-dung, in its crude state. Dung, therefore, which contains these should not be applied to the summer-fallow, but carted out in the Spring and used for hoed crops; in this way, the seeds will vegetate in the Fall, and then the young growth is effectually killed by ploughing for the next Spring-crops.

Johnswort (Hypericum) grows on such dry soils as are suitable to the application of gypsum; and this manure, or any other which is suitable to the soil, when pretty plentifully applied, and the land laid down with clover, or other suitable grass, will quickly eradicate every vestige of this weed.

Burdock (Arctium) and some similar weeds, should be cut, or dug up, while green.

Quitchgrass (Lolium) is considerably injurious to the growth of almost every plant. It prevails most in the stiffer soils. It starts afresh, wherever its large strong roots are cut with the plough or hoe; particularly when the soil is rather moist. When it is quite dry, the roots may be dragged to the surface by frequent harrowings, where they will perish; and this, together with long pasturing, or mowing the ground, is perhaps the only practicable method of geting rid of this grass. It should, however, be observed, that this is a tolerably good grass for either pasturing or mowing; especially when other grasses are mixed with it.

The seeds of this grass have some resemblance to grains of blasted rye. Grain designed for sowing may be mostly cleared of the seeds of it, by swiming the grain in water.

A species of this grass is cultivated in England, and is commonly called *Darnel* or *Raygrass*, and is much approved of to sow with red-clover; but probably this is the grass with broad striped leaves, which we have commonly heard called *Ribbongrass*.

See GRASSES.

Charlock (Sinapis) is also a troublesome weed. Sometimes it is called wild-mustard. *Mortimer* mentions a field of barley, which, by mowing when this weed was in blossom, gave the barley a chance to get above the weeds, as the mowing only took off the tops of the blades of the barley without injuring the crop. He supposes Cow-dung more favorable for increasing the growth of this weed, than any other manure; and recommends feeding Sheep on fallows infested with this weed, as they are very fond of it. The seeds will live many years in the earth, and afterwards vegetate, when it is cultivated.

Mr. *Deane* says 'grain should be sown thick, where there is danger of its being injured by Charlock, so that the crop may overtop the weeds. Barley sown thick will certainly prosper in such situation.'

Fallowing the land in an effectual manner, by repeated ploughings and harrowings, is perhaps the best method to extirpate this weed; for, as soon as the seeds are brought up near the surface, they will vegetate; and then the next ploughing, or harrowing, will destroy the young plants.

Sheep are much better than any other cattle for destroying weeds, by pasturing.

As all weeds are propagated by their seeds, none should be suffered to go to seed. This remark is no less applicable to the weeds before enumerated, than to the numerous class of biennials which commonly infest the fields. All weeds, by being suffered to grow, exhaust the soil. The ground, therefore, which is kept clear of weeds, will much easier retain its fertility, than that which is suffered to become full of their seeds. Generally speaking, any given quantity of weeds growing with a crop lessens its product, in proportion to the weight of the green weeds with that of the growing crop. Farmers should therefore be extremely careful in keeping all weeds out of their grounds, and in destroying the common biennials as fast as they appear, while the ground is bearing crops: And, in regard to those perennials, before enumerated, and all others which may infest the lands, the prevention of their growth is generally much easier than their extermination, after they have got footing in the soil. When, therefore, the Farmer sees new weeds start up in his land, let him immediately extirpate them, either by frequently mowing them off closely, by taking them out of the ground, or by smothering them with a sufficient quantity of earth, straw, chip-dung, or other rubbish; and thus he will find that a pennyworth of trouble, spent in the prevention of the disease, is worth a pound spent in the cure.

For destroying the common biennial weeds, *see* FALLOWING OF LAND.

WEEVIL. *See* INSECTS.

WELL. *See* WATER and PASTURE.

WHEAT (*Triticum.*) Under different articles of this Work, *to wit:* CHANGE OF CROPS, CHANGE OF SEEDS, DRILL, FALLOWING, GREEN-DRESSING, GYPSUM, HESSIAN-FLY, HARROWING, HARVESTING, MILDEW, SOILING, SOWING, SMUT, THRESHING, and WATER-FURROWING, considerable has been said which regards the culture of wheat, and need not here be repeated.

There are several species of this grain; such as, the Spring-wheat, and the different kinds of Winter-wheat; the *bald*, the *bearded*, the *cone*, the *Polish*, and the *Smyrna wheat*, &c. The latter has a central ear, with several smaller lateral ones, which spring from the lower end of the large one. It requires a rich soil, and it is probable that, in this Country, the horse-hoeing husbandry of Mr. *Tull* (*see* NEW HORSE-HOEING HUSBANDRY) would be more suitable for it than for any other kind.

Winter-wheat, in this State, and in some more southerly, will grow on almost every dry soil that is sufficiently rich. Very sandy and very gravelly soils are, however, the most unsuitable. Dry red loams, with a trifle of clay in them, are perhaps the best. Of the old States, the best wheat, and the greatest crops, are raised in what are called the Middle States. Mr. *Gregg*, of Pennsylvania, lately raised sixteen hundred bushels from forty acres, and crops still larger have been raised in Virginia. In this State, the greatest products are not quite so large; and the Eastern States are still less favorable for the growth of this grain.

The time for sowing wheat probably depends much on previous habit. Thus, if it were sown a number of successive years by the middle of August, and then the time of sowing were changed, at once, to October, the crop would probably be much lighter on that account; yet, where wheat has become habituated to be sown late, it will do tolerably well. The later it is sown, however, the more seed is requisite. When early sown, a bushel to the acre is believed to be sufficient; but, when sown later, a bushel and an half, or more, may be necessary. In England, they sow a much larger quantity than this; but it is probably an useless expenditure of seed. Let the Farmer, however, try experiments in this way, by sowing, two, three, or four bushels to the acre; and if well repaid, by a suitable increase of his crops, let him persevere in sowing that quantity of seed which he finds most advantageous.

Drilling in wheat will save as much as one-third of the seed. If wheat is found to grow larger in this way, than when sown in the broad-cast, the gain may be much greater. If it be soaked twenty-four hours in lie and brine, or old urine, with a proper mixture of saltpetre, its smutiness will be prevented, which in many instances may be a great saving; while the crop will be greatly augmented.

See SOWING

Thus, by paying attention to these particulars, and some others, the clear profits of a crop of wheat may perhaps be doubled.

Seed-wheat should always be run through a screen, before it is sown, to take out the seeds of cockle, drips, and other weeds which infest the crop. Care should also be taken, not to let the seed get any mixture of rye in it; as the cuting of this out requires considerable labor, and at the same time lessens the crop. The English Farmers say, that seed should never be taken of wheat which has grown on sandy land; but from that which has grown on soils most natural to it. The changing of seed should also be attended to, as this grain is found to degenerate. The Summer-wheat which is brought from Canada is found to produce much larger crops in this county (Herkimer) than that which has been sown here for some time. Wheat that is carried to a climate much more northerly, than that in which it has been long sown, will not answer well, as it will be too late in ripening.

The best preparations for a crop of wheat are Summer-fallowing, or a clover-sward turned under, and the wheat sown on it. The latter is good culture. The former ought never to constitute a part of a good system of farming, on account of its additional expense, unless it be to recruit exhausted lands, or to destroy weeds. But, where lands require to be fallowed, let the work be done effectually, by repeated ploughings and barrowings, in order that the ground be enriched, and the seeds of weeds destroyed. Beside clover, the Summer-crops, which are found best to precede a crop of wheat, are turnips, peas, vetches, and barley will do tolerably well; but let the ground be ploughed up immediately after the crop is taken off. A potatoe-crop is also very good; provided it be got off the ground sufficiently early for sowing the wheat. Indian corn, where the ground is in good heart, will do well, by cuting up the crop while green, and seting it up in shocks to ripen.

Where wheat has lodged so as to fall flat on the ground, the better way is to harvest it immediately, if the grain be only in the milk; for in that situation it will derive no further benefit from the earth, or from the air; whereas, if it be cut, and laid to dry, the seeds will derive nourishment from the stalk; and, though they be small, they will be as large as they would otherwise have been, perhaps larger, and at the same time will make much better flour. The treatment in this case ought to be the same as in case of mildew.

See MILDEW.

It is believed, there is nothing gained by leting wheat stand till it is fully ripe; that is, till the heads turn down, before it is harvested. If it stand so long, considerable will be shelled out before it is got into the barn; and even if the bulk should in this case be greater, still the weight may not be increased; and as wheat is now sold by weight, not by the bushel; and as it is known that the best flour is made from the earliest harvested wheat; the Farmer, from these considerations, may probably be the gainer by commencing his harvest considerably earlier than the usual time. In this way, too, he will be less in danger of having his wheat grown by long-continued rains; for it is found, that wheat which is harvested early is less liable to grow, than that which is cut late. That, however, which is designed for seed, ought to be harvested last, as it will vegetate more readily when late harvested.

As a matter of curiosity, it may be observed, that by frequently spliting the plants of wheat, and seting each part by itself, they may be greatly multiplied. Thus, by sowing the wheat in August you may split it, after it has branched out into a number of parts, and this may be again repeated in September, and repeated once or twice again in the Spring, until in this way you may make one seed produce more than half a bushel of grain.

Where wheat is likely to grow too large, the best way is to feed it down in the Spring, for such length of time as may be thought requisite; and in this way it will grow up with a stronger stalk, be less liable to lodge, and produce a great crop.

See RYE, for a very extraordinary crop that was raised in this way.

If the wheat cannot be conveniently fed off, let it be mowed off close, as often as may be found necessary, which will answer nearly the same purpose.

In England, experiments have been made of transplanting wheat in the Spring, by means of which the crops proved very good, and a great deal of seed was saved. This might be found peculiarly useful in wet lands, thrown up in ridges in the Spring. The expense of such culture would, probably, however, be too great in this Country; and therefore need not be minutely described.

Barberry-bushes or cherrytrees, planted in wheatfields, will make the wheat growing near them blast.

Spring-wheat should be sown as early as the ground can be made mellow; and there is little or no danger of its being too rich for this crop. It grows best on rich new lands, or on lands which have been well manured and bore Indian corn, or potatoes, the preceding year. The quality of this wheat is inferior to that of Winter-wheat, and the crop is usually smaller. It is, however, cultivated with more success than Winter-wheat, in much of the higher lands where the snow falls deep in the northerly parts of this State. The requisite quantity of seed to the acre is from one and a half to two bushels. Like barley, it degenerates; and new supplies of seed from Canada, or some more northerly climate, are found requisite.

A principal difficulty in raising Winter-wheat on the high lands of the northerly parts of this State, where the snow falls very deep, is, that it lies so long in the Spring that the wheat being then, from the warmth of the ground, inclined to vegetate, is prevented by reason of the snow which lies upon it, and, being thus excluded from the air, it dies of course. The most effectual remedy found, has been, to feed off the wheat closely in the Fall, which, it would seem, prevents it from starting in the Spring until the snow has dissolved.

Mr. *Peters* finds his wheat-crops greatly assisted, by weting the seed, and rolling it in gypsum, before sowing. This treatment makes the crop grow larger, ripen much earlier, and preserves it from rust or mildew. He also derives great benefit from harrowing his wheat in the Spring. He thinks five pecks of seed to the acre not too much, when sown broad-cast. He verifies the old remark, that lands which have been long manured with barn-dung are not so good for wheat; that such lands are more liable to mildew; and that this prevails most in low grounds. He finds peas much better than potatoes, to precede a crop of wheat.

Mr. *Ecroyd* also insists on the great utility of harrowing all Winter-crops of grain in the Spring, when the ground has first become suitably dried. He also says that all Winter-grain should be eaten off closely, and as suddenly as possible, by Sheep, Calves, &c. before harrowing; as this serves to help crops which appear diseased, as well as to prevent their lodging. He also recommends passing the roller over the crop, after harrowing.

Mr. *Peters* also says that wheat should never be the first crop raised, after the land has been manured with lime; but that rye, or Indian corn, may be cultivated with great advantage, immediately after applying this manure.

He has made trials of the Jerusalem wheat, and finds it more abundant in product, and less liable to lodge. The bread made of it he finds to be as well tasted as that of any other wheat; but it is considerably darker in color.

The Spanish Spring-wheat, lately brought to this Country from England, is said to yield an eighth more than any other wheat, and appears to be of good quality.

WHEEZING. A disease of Horses, commonly called broken wind; caused by surfeits, violent exercise when the belly is full; by being rode into cold water when very warm; or, from obstinate colds not cured.

For the cure, Dr. *Bracken* advises, that the Horse should have good nourishment, much grain, and little hay; and that the water given him to drink daily have a solution of half an ounce of saltpetre, and two drachms of sal ammoniac. It is said that the hay made of white-weed will cure this disorder.

WHEY. This liquor may be applied to many valuable uses.

See VINEGAR, for making that liquid out of this article.

It is good for feeding and fating Swine, and particularly excelent for Sows with sucking Pigs. Mr. *Deane* observes, however, that 'care should be taken not to overfeed Swine with this liquor; for it has often happened that after drinking plentifully of it, especially in hot weather, they will swell up and die.'

The Tartars make ardent spirits, and vinegar, from the whey of the milk of their Mares; and Mr. *Genet* says the Cowherds on the Alps, and in some parts of France, extract from the whey of the milk of their Cows a salt called sugar of milk, 'which the Swiss Doctors consider as the best detergent to purify the blood, and cure radically the most inveterate cutaneous complaints. For this purpose, the whey is clarified and boiled until reduced to one-fourth part of the whole, which is deposited in wooden or earthen pans in a cool place. In a short time, the saccharine particles are chrystalized, and the phlegmatic part is then decanted slowly, and the sugar is dried on pieces of gray paper.'

Mr. *Genet* supposes that, for curing cutaneous disorders among cattle of every kind, it would be sufficient to boil the whey down to sugar at once; though this, by being colored by the kettle, might not be so fit for pharmaceutical purposes. Probably whey itself, when given to such cattle as will drink it, will answer a similar purpose; and this seems the less to be doubted, from a case mentioned by Mr. *Genet*, of his successful use of the milk of a Cow, in regenerating a decayed imported Merino Ram; the animal being entirely free from the scab, during all the time he was fed on milk; while almost all the Sheep, which came from Spain with him, were subject to that disorder.

WILD-RICE (*Avena Fatuor.*) This plant which has commonly been called wild-rice, by the English, and Folle-avoine, by the French, is found in the bays, and other suitable places, bordering all the large Western Lakes, and other waters in that direction, almost as far north as Hudson's Bay. It has not been found farther south than about the thirty-ninth degree of latitude; though no doubt it may be cultivated in much milder climates. It grows on lands naturally covered with water, to the depth of from two to seven feet; it requires a rich or muddy bottom, and will not grow in that which is sandy. It is believed that it may be cultivated to advantage in many situations where it does not naturally grow, and that its culture would be found very advantageous; as it grows in situations where no other plant of any essential value is at present grown in this Country. We have seen it growing abundantly in a part of the bay of Littellodus, on Lake Ontario. It rises some height above the water; and in order to protect it from the water-fowls, which feed on it, the practice of the Indians is to go, in their canoes, amongst it, and tie it in bunches, about the time the grains have formed; in which situation it stands till ripe; when they gather it, by bending the bunches over the sides of the canoe, and beating out the grain with sticks; in which way they will soon fill a vessel of this description. When hulled, which we believe may be done in a manner similar to that of rice, it is said to be as nutricious as that grain, and as well tasted.

How far this species of the *Avena* may be successfully cultivated, in the manner that rice is raised in more southerly climates, remains yet to be ascertained by experiments. We are, however, impressed with the belief that it may be found a substitute for rice, and cultivated in all the northerly parts of this Country, where lands are naturally covered with water to a suitable depth, or where they can be thus covered in an artificial manner.

WILLOW (*Salix*) There are varieties of this tree, though not many that were found in this Country. The weeping-willow and some other kinds are imported.

Some kinds of this tree grow so rapidly, as to be valuable to plant for fuel. The twigs of one kind are used for making baskets, &c. Other kinds are good for making hedges, in wet lands. Perhaps the shrubby kind, that grows along the banks of many of our streams, would be very good for this purpose.

For making the hedge, either in the bank of a ditch, or otherwise, stakes of a proper length are cut and set a good depth in the ground, about a foot apart, and they will take root and grow; while new twigs, sprouting out from every part, soon forms them into a thick bushy hedge. This, when sufficiently grown, is to be treated as other hedges. *See* HEDGES.

In Greatbritain, some of the larger sorts of this tree are also raised for building-timber. In this case, says Mr. *Miller*, they are planted in rows, and stand six feet apart each way, and are trimed up the requisite height. When they become too thick, every other tree, in each row, is taken away. They may also be planted along the banks of ditches, for this purpose. The sets are seven or eight feet long when planted. The same Author observes, that every kind of willow is easily raised from sets or cutings, which readily take root, either in the Spring or Fall.

WINDGALLS. These are flatulent swellings on the bodies of Horses; but most commonly they are seated on both sides of the back sinew, above the fetlocks of this animal: Sometimes they are in the joints and tendons. They are generally filled with air and thin watery matter. Where they appear in the interstices of the large muscles, which then appear blown up like bladders, they are principally filled with air, and may be safely opened and treated as a common wound.

When they first appear, they are usually cured with restringents, and bandages drawn very tightly round them; for which purpose, let the swelling be bathed twice a day with vinegar, or verjuice, or fomented with a decoction of oak-bark, pomegranate, and allum, boiled in verjuice, and let the bandage which binds the windgall be soaked in the same.

If this should fail, the swelling may be drawn off by blistering, and applying the blistering ointment, repeating it at times, till the humor is all drawn off. Some, however, cut open these swellings, wherever they be situated, and treat them as a wound. But, perhaps, where they are in the joints, the blistering is the safer remedy, as the joints may be stiffened by imprudent management.

WIND-MACHINERY. The saving of labor by the use of the winds, seems to have been but little attended to; and yet it is believed that great advantages might be derived to the Farmer, from this source.

Suppose, for instance, that an apartment were made under the roof of the barn, at one end; in the middle of which should be properly fixed an upright shaft, extending up through the highest part of the roof, with four horizontal arms on the upper end, and on these sails fixed for turning the shaft when the winds should blow: Could there be any doubt, that this could be made to turn different kinds of machines, to be used for different purposes?

In this way, a threshing-machine and a cornshelling-machine might be moved with a great saving of manual labor. The cuting of straw and hay, for feeding cattle, could thus be almost entirely performed, and the no-less important business of grinding different kinds of grain, for feeding and fating of cattle, could be performed with equal ease. Perhaps, also, the breaking and cleaning of flax and hemp could be executed in this way, to advantage.

The raising of a constant supply of water from wells, for supplying cattle, is also easily performed in this way; and it is a matter of no difficult invention so to contrive the machinery, that it will stop raising water when the trough into which it is emptied shall be filled to a certain height. Churning may also be thus performed, with a very small expense, when the wind will answer.

It is but a trifling objection against all this, that the winds are inconstant, and that they blow unsteadily. The work required to be thus performed requires no great steadiness of operation; and days can always be chosen for performing most of these labors, when the winds blow most steadily.

The machinery for some of the purposes before mentioned should be so contrived as to be turned by hand, when the winds should not serve. It is immaterial what quarter the winds come from, where the sails are fixed on a horizontal wheel, as above intended, as the wheel will still turn the same way. The sails may be of very cheap materials, and the cost of the whole machinery need not be much. Any minute description of the machinery is here omited; because verbal descriptions of such are necessarily prolix, and at best difficult to be understood; and because any one, wishing to test the efficacy of this method of saving labor, need not be long ignorant of the best means of puting his wishes into execution. *

It is believed that *Pasmore*'s machine for cuting straw is the best that is used in Greatbritain. His machine for crushing different kinds of grain, between rollers, is also good, as being very expeditious; but probably those machines which grind the grain, in the manner that coffee is ground in small hand-mills, are the best. Descriptions and plates exhibiting his machines, as well as those of *Salmon*'s and *Macdougal*'s strawcuters, may be seen in a new British

Work, which has been often mentioned in this, called '*The Complete Grazier.*' Either of these machines might be easily adapted to the purpose of being turned by wind.

WINE. The presses used for making this liquor are similar to our screw-presses for making cider, though they are executed with much neater workmanship.

To make good wine, the grapes of the same vine should be gathered at different times. The first should be of the ripest clusters; and let them be cut close to the fruit to avoid the taste of the stalks. The green and roten grapes are to be rejected.

In due season, the second gathering takes place, when all that are ripe and sound are taken as before. The same may be observed of the last gathering, the grapes of which will be the poorest. To make wine in the greatest perfection, however, the grapes are all striped from the stems before they are put into the vat.

Wines of different colors are made from the same grape. The French make their white and red wine from the black-grape.

To make white-wine, grapes sufficient for a pressing are gathered early in a damp, misty morning, while the dew is on. This increases the quantity of wine, but renders it weaker. When the sun comes out warm, the gathering is discontinued.

The grapes gathered are carefully carried in panniers, on Horses, to the press, into which they are immediately put, and the first pressing is given without delay; which should be gentle, for fear of discoloring the liquor. The wine from this pressing is the most delicate, but not the strongest.

After the first pressing, the press is raised, the scattering grapes are laid on the cake, and the second pressing is given, in which more force is used than before. The second runing is but little inferior to the first, in flavor or color, while it is stronger and will keep longer. Sometimes the wines of these two pressings are mixed together.

After these pressings, the sides of the cake are cut down perpendicularly with a steel spade, so far as they exceed the upper part of the press that is let down on the cake. The cutings are laid on the top of the cake, and the third pressing, which is called the first cuting, is given. The juice pressed out at this time is excelent. A second and third cuting is in like manner given the cake, with pressings, till the juice ceases to run.

The liquor of the cutings becomes gradually more red, from the liquor contained in the skin of the grapes. The wines of these different cutings are collected separately, and afterwards mixed, according as they contain the quality that is wanted.

The pressings for the white-wine should be performed quickly, that the grapes may not have time to heat, and that the liquor may not remain too long on the *murk*.

In making red-wines of the same grapes, they are to be gathered when the sun shines the hotest. They are to be selected and gathered in the manner before directed.

When brought home, as before, they are mashed in a vat, and are then to lie in the liquor for a length of time, which must depend on the heat of the weather, the flavor of the *must*, and the height of color intended to be given. They are to be stired frequently, the better to raise a fermentation and reden the liquor.

The Authors of the '*Maison Rustique*' say, that, for the *Coulange wine*, four hours is sufficient for the grapes to lie in the liquor; and that, for the *Burgundy wine*, a whole day should be allowed. Others allow a much greater length of time. Perhaps this point will be best ascertained by experience, in different climates.

When the *must*, or liquor, has lain as long on the husks in the vats as is thought proper, it is poured off, strained, and put into casks. Afterwards the *murk*, or remainder of the grapes in the vat, is put into the press, and undergoes the pressings and cutings before mentioned. The liquor thus obtained, especially if the pressing be so hard as to crack the seeds of the grapes, has a stronger body than the first runing; but has not its fine, high, delicate flavor. Some of it is, however, frequently mixed with the other wines, to make them keep better.

Some pour water on the *murk* in the vat, after the liquor is drawn off, which should be done without delay, lest the *murk* sour, and leave it in this situation till they find the water pretty well colored, and judge that it has incorporated most of the remaining strength of the *murk;* they then draw off the water and press out the *murk* as dry as possible, and mix the liquor thus pressed out with the water, and barrel it. It will keep no longer than the following Winter; but is brisk and pleasant, while it keeps good.

The *murk* is used to mend wines, whether old or new, which want either color or strength. They are to be turned out of the casks on the *murk*, after the *must* has been drawn off, and then well stired up, and let stand twenty-four hours, if new wine, or twelve hours if old. When a sufficient color is thus given the wine, and it is no longer too sweet, but agreeable to drink, draw it off, barrel it, and put the *murk* to the press. New and old wines are, however, not to be mixed in this operation.

The unripened grapes, that were rejected at former gatherings, are to hang till they become a little frost-biten, and may then be made into wine which will answer to mix with other coarse red-wines.

When the *murk* has been fully pressed, it will still yield, when diluted with water, fermented, and distiled, a spirit for medical and domestic uses.

In some parts of Germany, where the grape does not come to full maturity, the Makers of wine have stoves in their wine-cellars, by which they are kept warm during the fermentation of their wines, and this, by heightening the fermentation, meliorates them, and renders them more fine. Exposing the casks to the sun will have the same effect, in wines which are too acrid to ferment sufficiently.

The People of Champaigne and Burgundy supply the want of fermentation, or of an insufficient one, in their late-made wines, by rolling the casks. After drawing the wines off from the first lees, three weeks after being first put up, they roll the casks backward and forward, five or six times a day, for four or five days successively; then two or three times a days for three or four days; then twice a day for four days more; then once a day for a week, and afterwards once in four or five days. This rolling is continued altogether for about six weeks, where the grapes were pressed very green; but a less time, if they were tolerably ripe.

The finest wines will work the soonest, and the fermentation will take ten or twelve days, according to the kind of wine, and the season of the year. Those that are backward in fermenting may be quickened, by puting into them a little of the forth or yeast that works from others. During fermentation, the bung-holes of the casks are to be left open, and should be closed when it abates, which is known by the froth ceasing to rise so fast as before. The cask is also then to be filled to within two inches of the top, and a vent-hole is to be left open to carry off all that is thrown up by further fermentation. The filling of the cask should be regularly done every two days, for about twelve days, in order that the foulness thrown up by the continued fermentation may be thrown out at the vent-hole, or it will fall back into the wine and prevent its becoming clear. After this the cask should be filled to within an inch of the bung, every fifth or sixth day, for a month; and then once a fortnight, for three months longer. When the fermentation is entirely over, the casks are to be filled up, and this is to be repeated once a month as long as they remain in the cellar, in order to prevent the wine growing flat and heavy. They should be filled with wine of the same kind which they contain, which may be kept in bottles for the purpose; and the vent-hole should be stoped when the fermentation is over.

The first drawing off from the lees is done about the middle of December, and the casks containing the liquor drawn off should stand without the least disturbance, by shaking, until the middle of February, when the liquor should be again drawn off into other casks. If there be then still so much lees as to endanger their contracting a putrid taint, let the wine be again drawn off in due season. Sometimes it may be necessary to repeat the racking several times; but let the casks be kept full, and let no wines of dissimilar qualities be mixed.

The lees are to be collected together, and, after settling, the thiner part may be distiled.

Brandy is often added to wine, when about to be transported, to prevent any further fermentation. Fumigating the casks with burnt brimstone will answer this purpose better; but it is said this will destroy the red color of wines. The colors of wine are, however, mostly artificial. A deep-yellow may be made by burnt-sugar, and a deep-red, by redwood, elderberries, &c.

Turbid wines are fined by isinglass, by puting a pound or two of fresh bloody meat into them, and by other means pointed out under Cider.

Where wine has become sour, let some salt of tartar be mixed with it, just before it is used, which will neutralize the acid.

In Summer, cool, clear days, with northerly winds, are the best times for drawing off wines, to prevent their freting or frothing.

For making *currant-wine*, *see* Currants.

Gooseberry-wine is made in the same manner as currant-wine.

Raisin-wine is made as follows: Take thirty gallons of clear rain or river-water, and put it into a vessel that will hold a third more; add a hundred weight of Malaga raisins picked from the stalks; mix the whole well together, and cover it over partly, but not entirely, with a linen cloth, and let it stand in a warm place, if the season be not warm. It will soon ferment, and must be well stired about twice in twenty-four hours, for twelve or fourteen days. By this time, if the liquor has lost its sweetness, and if the fermentation has nearly abated, which will be perceived by the the raisins lying quietly at the bottom, the liquor must be strained off, and the juice of the raisins pressed out, first by hand and afterwards by press, which may easily be contrived, by having two boards, and weights laid on the uppermost. All the liquor is then to be put into a good sound winecask, well dried and warmed, together with eight pound of sugar, and a little yeast; except that a little of the wine should be reserved in bottles, to be afterwards added during the fermentation, which will take place again. During this second fermentation, the cask must be kept nearly full, so that the froth or yeast will run out of the bung-hole. When the fermentation has ceased, which will be at the end of a month, the cask is to be stoped tight and kept a year, or more, and then bottled off.

This wine will be very good at the end of a year and a half; but will improve much by being kept four or five years; as it will then be equal to any of the strong cordial foreign wines, and by proper substances, to give it color and flavor, may be made to resemble them.

This is the most perfect of artificial wines, but others may be made cheaper; such, for instance, as supplying the place of every four pounds of raisins by one pound of sugar, so that only a fourth of the quantity of raisins above mentioned may be required; or by adding a proportion of well-rectified whiskey to the cask when closed, in which case less raisins and less sugar would be requisite.

Any kind of large raisins will answer as well as Malaga; but the thiner the skin, and the sweeter the pulp, the better the wine will be.

To make Birch-wine. After collecting the sap of the birch, it is to be made into wine before any fermentation takes place; and for this purpose, a pint of honey or a pound of sugar is to be added to every gallon of the sap, the whole to be well stired up, and then boiled for about an hour, with a few cloves and a little lemon-peel; during which, the scum is carefully to be taken off. When cool, a few spoonsful of new ale or yeast is to be added, to induce a due degree of fermentation; and after this has ceased, or nearly so, the liquor is to be bottled and put away in a cool place in the cellar, for use; though, no doubt, it becomes improved by age.

When properly made, the liquor, however, becomes so strong that it frequently bursts the bottles, unless they are placed in spring-water. Stone bottles are said to be the best for containing the liquor, as they are stronger than glass.

The black-birch affords the greatest quantity of sap, which may be drawn from the tree in plenty, by boring a hole into the southerly side, in the manner directed for extracting the sap from the maple.

See MAPLE.

The holes are to be pluged up, when no more sap is to be drawn.

Perhaps a liquor equally good might be made, in some similar manner, of the sap of the maple, and of the juice of watermelons, especially of those raised in the Southern States.

To make *Pomona-wine*. The directions published by Mr. *Cooper*, for making a wine of cider and other ingredients, which may properly be called *Pomona wine*, are as follows: Take cider of the best runing of the cheese, and of the best quality, and add to it as much honey as will make the liquor bear an egg; strain the liquor through a cloth as you pour it into the cask; fill the cask full, with the addition of two gallons of French brandy to a barrel; set it away in a cool place, with the bung-hole open, to ferment; as the fermentation proceeds, it will throw out considerable froth and filth; keep filling it frequently with more of the same kind of liquor, kept for the purpose, until the fermentation has nearly subsided; then put in the bung; but not tightly, in order that the liquor may have some further vent, and, as soon as the fermentation ceases, close up the vessel. The next Spring, rack off the liquor into a new clean cask; and, in order to clarify it, Mr. *Cooper* directs a mixture of sweet-milk, the whites of eggs, and clean sand to be beat up and well stired into the cask.

See Cider, for the particular directions for this.

But it is believed, that about a quart of sweet-milk to a barrel, well stired and mixed with the liquor as it is poured in, will answer equally well and perhaps better. This operation alone will not only clarify liquors, but, by repeating it several times, the highest-colored wines may be nearly or quite divested of all their color. After the liquor has been thus clarified, let it be again drawn off into bottles, or into fresh clean casks, and kept in a cool cellar for use. Mr. *Cooper* says that his liquor, thus prepared, has often been taken, by good judges of wine, for the real juice of the grape; and has been pronounced by them superior to most of the wines in use. Age, however, is essential in perfecting this kind of wine, as in all others.

Mr. *Clark*, in his '*Travels in Russia*,' makes mention of his having drank *mead* among the Cossacks of the Don, which was sixteen years old; and this liquor, which is little else than honey and water, he assures us, was equal to good Madeira-wine. Mr. *Cooper* adds, that the expense of making Pomona-wine does not exceed twenty-five or thirty cents a gallon.

Wine of a tolerable quality may be made of the juice of elderberries, in a manner similar to that of making currant-wine.

See Currants.

Raspberries and blackberries may also be applied to the same use; and less sugar will be found requisite in making wines of these than of currants.

In making artificial wines, French brandy is used to add more spirit, and to assist in imparting to them the requisite taste. But, as French brandy is somewhat expensive, it may not be amiss here to mention, that a very pleasant spirit, resembling that liquor in taste, may be made of the spirit distiled from cider, by puting into it a suitable proportion of dried peaches, baked *brown*, but not burnt. About half a gallon of these, or perhaps less, will impart to a barrel of this distiled spirit a very pleasant taste, smell, and color, after the liquor has had time to ripen by age. Whether this liquor, thus prepared, will precisely supply the place of French brandy, in making artificial wines, is not particularly known. Certain it is, however, that when it has age it has much of the brandy flavor, and is full as pleasant as that liquor. Common whiskey, also, when divested of its essential oil, may in like manner be turned into a pleasant brandy, after it has acquired sufficient age.

WOAD. The leaves of this plant, when reduced to a paste, by a proper degree of heat and fermentation, and the mass then sufficiently dried, is used by Diers, together with indigo, for making the best blue dies. Under MILKWEED, it will be seen that the leaves of that plant have been successfully used as a substitute for woad, and probably may be found less difficult and expensive in cultivation.

By a communication of Mr. *Parish*, of Greatbritain, who is himself a Dier, and a Cultivator of woad, it seems, however, that the cultivation of this plant has made fortunes to several in that Country, when grown on suitable lands; and that it is an excelent preparative for a crop of wheat.

The soil, he says, which suits it best, is a fertile moist loam, and if underlaid with clay the better; that ground of this kind, which has long lain in pasture or meadow, is much preferable to land constantly tilled with grain, as being more clear of weeds; that it is vain to expect a good crop of this plant, and of good quality, on poor shallow land; for that, if the crop on such land should even be abundant, as it may be by manuring; still such lands can never impart to the woad its essential quality to make it valuable for dying; and more especially if the season be wet and cold. Warm showery seasons, neither too dry nor too wet, are the most suitable for its growth.

Mr. *Parish* says he once had occasion to purchase woad that was grown in a very wet season, and found, on using it in his vats, that it was impossible to regulate their fermentation; that, on experiencing this difficulty, he purchased woad that was grown in a more genial season, and then he succeeded; that he kept the other three or four years, and then found it more steady in its fermentation; but that it then required double the quantity, and even with this its effects were not so beneficial, as when good woad was used.

Let the sward be broken in the Fall, and the ground ploughed and harrowed again in the Spring. The crop should be put in as early as the ground can be properly prepared. Where the sward can be completely turned over, this may be done as early in the Spring as possible, and the crop sowed or planted, as the case may be, on the sward, after it has first had about twenty-four bushels of lime to the acre, and this harrowed in.

The seeds may be sown in the broadcast way, and the plants afterwards thined in hoeing, similar to the common method of cultivating turnips; or they may be drilled in rows, or planted in the quincux way; and for this latter purpose a board, with pegs set into it diagonally, at the distance of twenty inches, or twenty-four, if the soil be very strong, is used to make the holes for the seed, and into each hole three or four seeds are to be droped, and covered with the roller, or the harrow.

Mr. *Parish* says he has been most successful in this latter mode of planting. Land cannot be too rich for the crop; and it often fails when cultivated on land not sufficiently strong, or moist, or when the hoeing is not well attended to, and weeds are suffered to rise. In hoeing, some earth should be drawn round the plants. If the season will admit of puting the seeds into the ground so early, as to have the plants strong before dry weather comes on, there will be almost a certainty of a good crop, where the land is of the right kind, sufficiently rich, and well cultivated.

Previous to commiting the seeds to the earth, they should be soaked in water, with a mixture of fresh-slaked lime and soot, until they begin to vegetate, and break the pods in which each seed is enclosed. If the ground be moist, the young plants will appear in a few days.

Mr. *Parish* also advises, to strew more fresh-slaked lime on the surface of the ground, after planting, or sowing; when, if showers invite grubs or snails to eat the young plants, this manure will destroy these insects. But perhaps this may as well be omited, until it be seen whether the young plants become infested with these enemies; and, on their first appearance, strew on the lime, as before mentioned, and this will soon destroy them.

He also says, that he once cultivated this crop for three years successively on the same ground; but found this to be an error; for, after the plants came up strong and healthy, they were soon observed to decay and wither; and on examining the roots he found them attacked by the wireworm. He, however, destroyed these by applying forty-eight bushels of fresh-slaked lime to the acre, and harrowing it in, which gave him a good crop.

He advises, therefore, never to cultivate more than two crops successively on the same ground, from an opinion that the want of a change in this crop, and some others, is the cause of their becoming more liable to the depredations of insects. Be this as it may, we have no doubt but that a proper solution of salt and water, applied to the roots of the plants, would have destroyed the wireworm as effectually as the application of the lime.

See INSECTS.

The leaves of this plant, when grown on good land, and in a good season, grow very large and long; and when they should be gathered, a brownish spot, inclining to a purple towards its centre, appears near the ends; while the other parts of the leaves still appear green, but a little tinged with yellow.

The leaves are to be gathered from two to four, and even five, times in a season, as Mr. *Parish* once experienced; and for the next Spring he saved an acre for seed, of which he had a good crop. He also picked off the young seedling sprouts from what he had thus saved for seed, and mixed them with his first gathering of what was newly sown, which he found to answer very well. But at another time, when he let these sprouts grow too long, they became too hard, and were of little value.

When a second crop is to be taken from the ground, it should be ploughed up in ridges in the Fall, after the last gathering of the leaves; but, where wheat is to follow, the ploughing for that crop must be sufficiently early for sowing it in season.

After describing the common method of preparing woad, he proceeds to describe the process he pursues for this purpose, which he says is beyond comparison the best, and is as follows:

After gathering the leaves, they are to be put to dry, and to be turned so often as to prevent their heating so much as to be reduced to a paste. In wet weather, a stove is to be used for this purpose. When a quantity is sufficiently dried, which in England requires about a week (but less time would probably answer here) it is to be thrown into a heap, where, if not too dry, it will begin to heat and ferment; if too wet, it will rot, but not properly ferment, nor readily become in a condition for the Dier.

If the heap is too dry for fermenting, it is to be moistened with limewater, applied by a wateringpot. When the heat increases too rapidly, the heap must be turned, and very fine flour-lime strewed between different layers. That which requires most lime to preserve a temperate degree of fermentation, and takes most time in fermenting, is the best, 'so that at length it comes to that heat which is indispensable to the production of good woad.'

When the leaves begin to be reduced to a paste, the surface of the heap must be kept as smooth as possible, and free from cracks; as this prevents the escape of much carbonic acid gas, which is furnished by the lime, as well as by the fermentation; 'and it also preserves it from the fly, magots, and worms, which often are seen in those parts where the heat is not so great, or the lime is not in sufficient quantity to destroy them. It is surprising to observe what a degree of heat they will bear. This attention to rendering the surface of the couch (the heap) even and compact, is essentially necessary, and to turning the woad as a dung exactly, diging perpendicularly to the bottom. The couching-house (where the heap is made) should have an even floor of stone or brick, and the walls should be the same, and every part of the couch of woad should be beaten with a shovel, and troden, to render it as compact as possible.'

'The Grower of woad should erect a long shed in the centre of his land, facing the south, the ground lying on a descent, so as to admit the sun to the back part; and here the woad should be put down as gathered, and spread thin at one end, keeping Children to turn it towards the other end,' and 'the couch should be at the other end.'

Mr. *Parish* supposes the degree of heat, 'necessary to produce that change of smell which is necessary to finish a couch of woad properly for the Dier, to be about from one hundred to one hundred and twenty degrees of Fahrenheit, and that it cannot be regularly obtained but by temperance and time.'

'Good woad, such as the richest land produces, will be of a blackish green and mouldy; and, when small lumps are pulled asunder, the fractures and fibres are brown; and these fibres will draw apart like small threads; and the more stringy they are, and the darker the external appearance, and if of a green hue, the better the woad; but poor land produces it of a light brownish green. The fibres only serve to show that it has not suffered by putrefaction.'

When the couch or heap of woad 'has attained its due degree of fermentation, it is to be opened, spread, and turned, until regularly cooled; and then it is in condition for sale: But the immediate use of wood new from the couch is not advised by Diers who are experienced; for new wood is not so regular in its fermentation in the blue-vat.'

We have thus given the substance of the communication of Mr. *Parish*, partly in his own words, and partly in our own, where we supposed we could be more explicit and concise. What has been said will, as we believe, enable any one sucessfully to raise this plant, and prepare it for the Dier; especially with the aid of a little experience in the culture and process of preparation.

WOLVES. For the method of preventing their killing Sheep, *see* SHEEP.

Wolves are easily caught in traps, and, as many frontier towns are in the habit of offering considerable premiums for every Wolf that may be killed, we will suggest a method of destroying them, which it is believed would be successful.

Build a close board-pen out in the wilderness, where the Wolves most frequent, so high that they cannot get over it; let it be about twenty feet square; leave a hole in each side of it just large enough for a Wolf to thrust his head into; put three or four Sheep into the pen and feed them there; Take pieces of tainted meat and drag them along on the ground, off for miles, in different directions from the pen. The Wolves coming across the scents made by these trails will follow them to the pen, and when there they will stick their heads through the holes to get at the Sheep. Let the Sheep be prevented from coming too close to these holes.

All then that is further to be done is to contrive traps, which, as they run their heads through the holes, will either kill them, hang them, or otherwise hold them fast till they can be killed or taken; and the different methods of doing this, any Hunter of common ingenuity can easily contrive for himself.

This plan would be equally useful where the Farmer folds his Sheep every night, to keep off the Wolves.

WOODHOUSE. Every Farmer should provide himself with this building; and into this let him every Winter store away wood sufficient for the ensuing year, so that he may have a constant supply of dry fuel. Any kind of wood, even that which is much decayed, will burn well when dry; and half of any given quantity of dry wood will give more heat than the whole where it is wet and green; so that there is a considerable saving of wood in having it dry, to say nothing of the greater pleasure and convenience it affords.

A house twenty feet square and ten feet high will hold fifty cords of wood; but if the Farmer will be at the pains to have his rooms warmed, and his culinary business performed, in the most approved and economical manner, he will find the one-half of this yearly quantity of wood sufficient for all his purposes; and thus make a saving in this article alone to the amount of at least thirty dollars a year, and, where fuel is dear, to perhaps double that amount.

See Warming of Rooms.

In cuting wood short, after it is carted home, a saw should be used; as this makes a great saving of the wood, and is at the same time equally expeditious.

WOUNDS. Mr. *Bartlet* directs, where Horses or other cattle receive any large wound, the first step is to sow it up, if it be in such part of the body as will admit of this; for in some parts the wound will be drawn open by the lying down, or rising, of the animal. Where the wound is deep, let the stitches be proportionately deep, so as to bring the lower parts of it together. The stitches may be half an inch or more apart.

If an artery has been opened, let it be secured by passing a crooked needle underneath and tying it up. If this cannot be done, apply a button of lint or tow, diped in a strong solution of blue vitriol, close to the mouth of the bleeding vessel, and be careful that it be kept there, by a proper compress and bandage, till an *eschar* is formed.

The lips of the wound being brought together by the needle or bandage, it needs only to be covered with rags diped in brandy. Where the blood of the animal is, however, in a bad state, which may soon be known by the aspect of the wound, and its not healing, the blood should be rectified by internal medicines. The wounded part should be kept as free from motion as possible.

All wounds of the joints, tendons, and membraneous parts should be dressed with terebinthine medicines, to which may be added honey, and the tincture of myrrh. All greasy applications should be avoided. Fomentations and poultices are also of great use here.

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YEAST. For the best yeast, *see* Beer.

A method of making what may be called a portable or durable yeast, is as follows:

Take a quantity of hops, suitable to the quantity of yeast you intend to make, boil them well, and strain off the water in which they are boiled; into this water stir a suitable quantity of flour, and considerable salt, and then add to this a proportionate quantity of good yeast; let this mass rise as much as it will; then stir in fine Indian meal till it is so thick as that it can be made into small cakes of the size of a dollar or larger. When the cakes are thus made, dry them in the sun till they are hard, minding to turn them frequently to prevent their moulding, and then lay them by in a dry place, for future use.

When you wish to have yeast, take one of these cakes, crumble it to pieces, pour warm water on it, and let it stand in a warm place, and it will soon rise sufficiently to make good yeast. A quantity of these cakes may be thus made at once, which will last for six months or more.

YELLOWS. In Neat-cattle this disease is usually called *the overflowing of the gall;* in Horses, it is called the *yellows* or *jaundice.*

See Neat cattle.

When Horses are troubled with this disorder, it is known by the yellowness of the eyes and of the inside of the mouth. The animal becomes dull and refuses to eat. The fever and the yellowness increase together. His urine is voided with difficulty, and looks red after it has lain some time. The off-side of the belly is sometimes hard and distended. If the disorder be not checked, he becomes frantic.

In old Horses, when the liver has been long diseased, the cure is hardly practicable, and ends fatally with a wasting diarrhoea; but, says Mr. *Bartlet*, when the disease is recent, and the Horse young, there is no danger, if the following directions are observed:

First, bleed plentifully and give the laxative clyster, as Horses having this disorder are usually costive; and the next day give him a purge of an ounce and a half of cream of tartar, half an ounce of Castile-soap, and ten drachms of succotrine aloes. Repeat this two or three times, giving intermediately the following balls and drink: Take Ethiop's mineral, half an ounce; millepedes, the same quantity; Castile-soap, one ounce; make this into a ball, and give one every day, and wash it down with a pint of this decoction: Take madder-root and turmerick, of each four ounces; burdock-root, sliced, half a pound; Monk's rhubarb, four ounces; boil the whole in a gallon of forge-water down to three quarts; strain it off and sweeten it with honey.

Balls of Castile-soap and turmerick may also be given for this purpose, three or four ounces a day, and will in most cases succeed in effecting a cure.

By these means, the disorder generally abates in a week, which may be seen in the alteration of the Horse's eyes and mouth; but the medicines must be continued till the yellowness is removed. Should the disorder prove obstinate, you must try more potent medicines, *viz.* Mercurial physic, repeated two or three times, at proper intervals, and then the following balls: Take salt of tartar, two ounces; cinnabar of antimony, four ounces; live millepedes and filings of steel, of each, four ounces; Castile-soap, half a pound; make these into balls of the size of hen's eggs, and give one of them night and morning with a pint of the above drink. On the recovery of the Horse, give him two or three mild purges, and if he be full and fat put in a rowel.

APPENDIX.

[The following articles were not received in time to be inserted in their proper places in this Work; they are therefore added as an Appendix.]

APPLES. Mr. *Preston*, of Pennsylvania, says that apples, kept over Winter, are most inclined to rot during the time that apple-trees are in blossom. He directs that, when the frost is over, they should be spread on a floor for some time, and that those inclining to rot should then be taken out. After this, he says, they will shrivel somewhat; but that those, of a good kind to keep, may be kept sound till the next crop of apples ripens.

BREAD. Dr. *Darwin* asserts, that the starch which may be extracted from any given number of pounds of raw potatoes, added to as many pounds of this root when boiled, will make bread equal to that made from the best wheat flour: The boiled potatoes are to be mashed fine, with the starch, in its wet state, added to them, and then to be made in the manner of wheaten bread. An equal number of pounds of wheat flour, and of boiled potatoes, well mashed, will also make good bread. Or, instead of potatoes, boiled turnips, well mashed, and the juice mostly squeezed out, will answer very well; but in such case the bread is to be kept about twenty-four hours, before eating, by which time it will lose the taste and smell of the turnips. They are to be peeled before boiling; and the potatoes to be skined before they are used.

Take twelve ounces of rice, boil it till quite soft, strain off the liquor (which makes the best of starch) add the rice to four pounds of wheat flour, and the whole, when made into bread in the usual way, will weigh seven pounds; so that this addition of boiled rice gives upwards of a pound more of bread, than if four pounds twelve ounces of flour had been used for the purpose; the bread made with the addition of the rice is equally good as that made entirely of flour, and will keep moist considerably longer. It, however, requires a little longer time in the process of rising.

There is also a still greater addition to be made to the weight and quantity of wheaten bread, by boiling the bran, which is separated from the flour in bolting, and kneading up the whole boiled mass with the flour. The bran should be boiled about twenty minutes, by which operation its weight and its nutrimental qualities are greatly increased; and when cooled to lukewarmness it may be added to the flour to be made into bread. Or the water in which the bran is boiled may be pressed out and added to the flour; and this of itself will make a very considerable addition to the weight and quantity of the bread.

Stale bread is more wholesome than that which is newly baked, as the latter contains a large proportion of indigestible paste; which may, however, be rendered less hurtful, by toasting.

To make bread with salt. Take as much of this article as is necessary for the quantity of bread to be made; dissolve the salt in a quantity of warm water sufficient to mix the flour intended to be baked; mix some flour in this water, and set it in a pot near the fire; but not so near as to burn the flour: A yellow water will soon rise on the top, which is to be taken off, and the rising will begin; then mix the contents of the pot with the flour, add more warm water, if necessary, and in less than an hour the mass will be ready for baking; and when baked will be found as well raised and tasted as bread raised with yeast. From three to four hours are requisite in this process, from the time of first preparing the salt and water.

BURNET-GRASS. Mr. *Deane*, in speaking of this grass, says, 'I have had a bed of this grass for two years past on a hungry sand. It has grown luxuriantly, the stems rising to the height of three feet; and the seeds ripened the year it was sown, though it was not sown till the end of May. The second year the seeds ripened, I think, in June. The severity of our Winter-frost neither killed any of it, nor so much as altered the verdure of the stems or leaves. Some of it was cut up and given to cattle, as soon as the snow was off, which they ate very greedily.

'I think this plant bids fair to be a profitable grass in this Country, where frost occasions the confining our stocks to dry fodder for six or seven months. For, on a pasture of this grass, Cattle, Horses, and Sheep may feed till the ground is covered with snow; and again in the Spring, as soon as the ground is bare. It is also excelent for soiling, or to give green to cattle in racks; and when it is made into hay, the leaves are not apt to crumble, or any part of the hay to be wasted.

'They who wish to propagate this grass may be assured, that there is not the least difficulty in doing it; for it is not only a most hardy plant, but I have not found it to be at all liable to be hurt by any kind of insects. The English Farmers recommend keeping it clear of weeds during the first Summer, or till it is so large as to cover the ground. This may be done partly by harrowing; for, as it is a strong tap-rooted plant, the teeth of the harrow will not injure the roots.'

CABBAGE. Mr. *Peters*, of Pennsylvania, plants his cabbages in September, when he intends them for an early supply for the next year; and in this way he brings them earlier forward, than those raised in hotbeds. He drills in the seed, on ridges raised for the purpose, and lets the plants stand exposed to the Winter. Some of these are killed by the frost; but as they stand pretty thickly, as they are left in the Fall, a sufficiency of them survive the Winter, to be thined out the next Spring for growing at proper distances.

CAMEL. There are four different species of this animal, the *Bactrian* Camel, the *Dromedary*, the *Lama*, and the *Cameleopard*. The three former, having long been domesticated, are eminently serviceable for carrying burdens, and for traveling with great speed. The latter has never been subjected to the dominion of Man.

The Bactrian is the largest, and can conveniently carry about half a ton at a time, with which he will easily travel thirty miles in a day. The Chinese have a variety of this species, which they call *Fong Kyo Fo*, or Camels with feet of the wind; one of which will carry its Rider one hundred and fifty miles a day. The common kind of this species may be rode one hundred miles in that time. It has two large protuberances on its back.

The Dromedary is smaller, has but one, and carries about six hundred weight.

The Lama is much smaller than either of these, and carries a burden proportionately less.

The species first mentioned is considered the most serviceable. For the most prominent uses, for which the two former are fited by Nature, *viz.* for carrying burdens, and for expeditious traveling, they are by far the most valuable animals on earth. Without them, much of Asia and Africa could scarcely be inhabited by Man. They are extremely docile, lying or stooping down to receive, or to be relieved from, their load; they want neither whip nor spur to urge them forward; and even when tired, music, or a song, will give them fresh animation; their feet are adapted either for soft sandy or rough rocky ways. They endure hunger and thirst to a surprising degree, and can subsist at all times on the coarsest fare. Their flesh is well tasted and nourishing; the females of each sort afford considerable supplies of milk. Their hair is very valuable for manufacturing into cloths; and the oil afforded from the bunches on their backs is highly esteemed for several medical uses.

The Camel is a native of the torrid zone; but as they are now used by the Tartars, who inhabit the Country round lake Baikal, which is several hundred miles north of China, it would seem that they may become habituated to almost any climate.

As twelve of the Bactrian Camels would be sufficient for transporting six tons, and as these twelve could all be attended by one Driver; as they may be kept at less than half the expense requisite for keeping the number of Horses necessary for transporting the same weight; and as the transportation on Camels requires no essential expense in the construction or repair of roads, and none whatever for carriages; it would seem, from all these considerations, that land-carriage might be performed, by the use of these animals, for about one-fourth of the expense that is usually incured: And, if so, it only remains to be asked, Why has the use of Camels, for this purpose, been so long neglected, both in Europe and in this Country? Even if only one-half of the expense of land-transportation could thus be saved, it would prove a great source of wealth to the farming interest of this Country, where many articles of produce will not bear the expense of carriage to market.

CAPER (*Capparis.*) There are seven species of this plant; but the common caper (*Spinosa*) is mostly cultivated in the more southerly parts of Europe. It is propagated from the seeds, and the buds are pickled with vinegar, &c. They excite the appetite, assist digestion, and are useful as detergents and aperients, in obstructions of the liver.

Mr. *Jefferson*, in a letter to the Committee of Correspondence of the Agricultural Society of South-carolina, dated Paris, July, 1787, recommends the introduction of the caper into the Southern States. He observes, 'The caper, though a tender plant, is certain in its produce; because a mound of earth of the size of a cucumber-hill, thrown over the plant in the Autumn, protects it effectually against the cold of the Winter. When the danger of frost is over in the Spring, they are to be uncovered, and the culture begun. There are a great deal in the neighborhood of Toulon. The plants are set about eight feet apart, and yield, one year with another, about two pounds of capers each, worth, on the spot, about six pence *sterling* the pound. They require little culture, and this may be performed either with the plough or hoe. The principal work is the gathering of the fruit, as it forms. Every plant must be picked every other day, from the last of June until the middle of October. But this is the work of Women and Children. This plant does well in any kind of soil, which is dry, or even in walls, where there is no soil; and they last the life of a Man. Toulon would be the proper port to apply for them.'

Dr. *Mease* says, 'The seeds must be brought over in their capsules, as they will keep much better than without them; but these should be secured from insects, by wraping them in tobacco-leaves which are well dried. Without this precaution, the seeds will be destroyed before they arrive.'

CARROT. The orange-colored carrot is the best for cultivation. Mr. *Cooper*, of Newjersey, raised eight hundred bushels of these to an acre. The crop may be mowed twice during its growth; the mowings will somewhat assist the growth of the roots; and the tops thus taken off are much relished by cattle.

It is contended by some, that the beds for the drills of carrots should be underlaid with manure, in the manner of turnips.

See TURNIPS.

INSECTS. The grub is propagated by the beetle, or black-bug, which, during Summer, is constantly to be seen rolling little balls composed of cow or horse-dung. These balls are deposited in holes in the ground, and contain the materials for a numerous progeny of gurbs, which are brought forth the next Spring, and, in due season, are metamorphosed into beetles.

A Writer, in a Paper published at Raleigh, North-carolina, says, that he has never found any thing so effectual for preventing the ravages of grubs in Indian corn, as Fall-ploughing; a practice which he particularly recommends, as being of singular use for this purpose, as well as for its excelent effect on the growth of the crop which is to follow.

[The Agricultural Society of Albany county, Newyork, having offered forty dollars for the best Essay on a Rotation of Crops, and on Manures, and their most profitable application, the premium was awarded to the Author of this Work. It was not confined to Residents of the county, but was offered for the best Essay on these subjects. The Author has forwarded it for insertion in the Appendix to this Work, from a belief that the Rotation of Crops, therein proposed, is the best that can be devised; and also that, on the subject of the most *profitable application* of manures, he has, in this Essay, been more explicit than in the article MANURES, in the body of this Work.]

ROTATION OF CROPS, &c. Some soils are peculiarly adapted for the growth of particular plants, and in such case many successive yearly growths of them may be raised, without manure, and without material diminution of product. We have known an instance of fourteen good crops of wheat raised successively on the same ground; another, of eighteen crops of oats; others, of at least ten of barley, and nearly twenty of rye: But these were peculiar soils; and although this sameness of culture was found successful, no inference is therefore to be drawn that it was the most profitable, or that such soils would not eventually tire of their favorite crops, and then be found exhausted and unfit for others. Generally speaking, we conceive that one of the most important points in husbandry is a judicious rotation of such crops as are most profitable for culture, and at the same time best adapted for the particular soils which are to be cultivated. Lands seem naturally to require a change of growths. Where the oak has disappeared, after it had lifted its head to the Springs of ages, another oak will not naturally rise, but some other tree. Instances have been known of lands covered solely with trees of deciduous growth, where the knots of the pitch-pine were still to be found; a proof that pine was once a tenant of the soil. In the Southern States, where lands have been exhausted with injudicious cropping, and then thrown out to common, they soon become covered with growths of trees different from those they originally bore.

Some plants are so unfit for long continuance in any particular place that they are endowed with migratory powers, either by their winged seeds, which are wafted abroad by the winds; by their roots, by which they change their places of growth beneath the surface; or by their vines, by which they travel above ground, and thus locate themselves in different situations. Of the first description are the varieties of the thistle, the milkweed, and the fireweed; of the second, the potatoe and some other bulbous-rooted plants; of the third, the strawberry, the blackberry, the different species of the gourd-tribe. The stalks of erect plants fall when they ripen, and thus the seed reaches the ground at a distance from the roots which produced them. There seems, indeed, to be generally a disposition in the earth to require changes in the plants it nourishes, in order that it may impart the food that is best adapted for each; and Providence, in his infinite wisdom, has endowed these, while growing in a state of Nature, with such properties as are best calculated to effect the changes. Let the Cultivator, therefore, study Nature, and follow her dictates, if he wishes either success or applause in his employment.

In regard to changes of crops, a general rule has been recommended of alternate growths of leguminous and culmiferous kinds, and of green-crops and grain-crops; but perhaps it would be quite as philosophical to insist upon alternate growths of fibrous, and taprooted plants; the former deriving their food from the surface of the earth, the latter from greater depths. But the value of crops, and the expense of raising each, should be duly estimated, in making selections for rotations. Let us say, for instance, that the average crops of wheat, barley, and Indian corn, at the greatest extent, may average fifty dollars in value to the acre, after the grain is ready for market; crops of rye, oats, and peas, not more than two-thirds of this amount; buckwheat, considerably less. From lands suitable for ruta-baga, or mangle-wurtzel, it would seem that from five to six hundred bushels to the acre may be expected, with good culture; which, at eighteen cents per bushel, a price certainly not beyond the proportionate value we have just given to the grain-crops, will average about one hundred dollars as the value of an acre. The entire expense of either of these crops of roots, when ready for use, is not essentially greater than the expense incurred in producing grain-crops; of course, it must be evident that these afford from thirty to fifty dollars an acre less of clear profit than a crop of either of the roots just mentioned. With a proper application of the requisite quantity of manure to ruta-baga, it may be successfully grown on almost any dry soil, when well and deeply mellowed, from the sandy to the deep rich loams. Soils of the latter description are best adapted for mangle-wurtzel. Either of these roots, when steamboiled, and especially with the addition of some meal, will answer all the purposes for which grain is used for feeding cattle of all sorts, from the Horse down to the Hog. Even stage-horses, which, from the severity of their labor, require the most nourishing food, have been kept in England on hay and steamboiled ruta-baga.

Mr. *Cobbett* says, 'a Hog of a good sort may be sufficiently fated with this root, when steamboiled.' Allowing, what we believe can hardly be admited, that a bushel of oats contains as much nutriment as three of this root; still it is evident that the usual product of one acre of it will go as far in keeping Horses as four of oats. Neither of these root-crops requires any considerable expenditure in seed; and on this account, if on no other, they are preferable to crops of the potatoe and of the Jerusalem artichoke, which in the article of seed are perhaps the most expensive of any whatever. We, however, consider crops even of these roots more profitable than those of grain, and particularly the potatoe, when judiciously cultivated in climates most suitable for its growth. For the various uses of this root, for culinary purposes, it stands indeed without a rival. In point of profit, we would also give to the carrot, the parsnip, and the onion, a preference to crops of grain; but the soils well adapted for them are more limited, and their culture is more expensive; and although they should form a part of the products of the farm, we cannot recommend them as being in all instances proper for a judicious rotation of crops. The common turnip, and the cabbage, are also entitled to attention. The pumpkin is as nutricious as the same weight of any root or vegetable whatever, and its culture as cheap; but whether its product, in weight, can be made to compete with that of roots, is a matter of which we are not informed. If fifteen tons to the acre could be usually obtained of this species of gourd, we should be induced to pronounce the crop, in point of profit and use, unrivaled as a preparative for a crop of Winter-grain. The crop would be found among those which are least expensive in seed, in culture, and in gathering; none would occasion less exhaustion of soil, nor require less for manure, as a little gypsum to the hills, or drills, will be found to have a powerful effect on its growth; but of its more complete cultivation we shall presently speak.

In Pennsylvania, and farther to the south, a successful mode of culture has been put in practice of growing Indian corn and potatoes in alternate rows or drills; and in this way about a sixth more of product, in the aggregate, is obtained from the ground, than if these two sorts of crops were cultivated separately. Such is found to be the fact; and the reason for it seems to be, that each crop has, in this way, more space given for the extension of its roots in search of its favorite food, and each has the like room above ground for deriving from the air the nutriment that is most suitable. Corn, in particular, it is well known, is liable to much injury, if planted too closely. There is, indeed, a variety of cases where this mingling of growths is found very advantageous, and whenever we shall venture to recommend the practice, it will be founded on a conviction of its utility. There are also some instances, even in this northern latitude, in which two crops may be had in a season from the same ground, and any case where it may be advisable shall be duly noted.

It should farther be observed, that in suggesting what may be deemed the most suitable changes of crops, no reference will be had to the actual state of farming among us, but merely what the state of farming ought to be; and in pursuance of this course we shall, in a great measure, discard the idea, too long prevalent in this Country, that we should make the most of our labor, not the most of our land:

We shall, on the contrary, insist that, generally speaking, making the most of our lands, under a proper course of husbandry, is the right way to realize the most from our labor. We shall therefore begin with the most usual soil of this Country, the dry, arable lands, which are usually suited for a variety of crops. Of the stiff clays, the hard gravels, and light sands, soils which abound but little here, we shall speak in particular. In ploughing, we shall advise that the usual depth be about six inches, or about a third deeper than our Farmers commonly plough; but that the depth should sometimes be greater than this, and sometimes less. We shall also insist on the ploughing being done in the most perfect manner, and not in the slight way too often practised: and we shall farther premise, that the plan of culture we recommend is necessarily connected with the business of the dairy, to greater or less extent; and with that of the Grazier, in feeding and fating cattle of every description. Such we conceive to be the only true and profitable course to conduct farming in this Country; but deviations from this may in some cases be found equally profitable. In general, however, we advise to this course of farming; for in this way the greatest quantity of manure is afforded; and for most lands manure is essential for obtaining the greatest crops, and of course for realizing the greatest profits.

We shall begin with the ground in wheat or rye-stubble, as at the end of our course we propose to leave it. Let the stubble-ground be well turned over in the Fall, to the depth of, say, six inches. It should not be turned under until a sward of white-clover has covered the ground, which is to be produced by giving it a top-dressing of gypsum in the Spring. Under the subject of manures, the reasons for this will be explained, when treating of gypsum. In the Spring, give the ground one or two ploughings more, as the nature of the soil may require, and of the same depth, and let the last ploughing be just before the proper time for planting Indian corn; for this crop, with an intermixture of other plants, is what we propose to begin with. Say, for instance, that the intermixture shall consist of the potatoe, of the pumpkin, and of the common turnip, a third part of each. We propose planting these crops in drills, in preference to hills, from a well-founded conviction that in the former method considerably more may be obtained from the ground. Let furrows be run, at a good depth, for the drills, at the distance of about every three and a half feet. In these furrows lay of the shortest and best of the fresh barn-dung, at the rate of about twenty wagon-loads to the acre. For the drills intended for potatoes the longer sort of barn-dung is as good as any other. If the different sorts of barn-dung can be applied to the soils most suitable for each, as is mentioned in speaking of manures, this should always be attended to; that is, sheep and horse-dung for the moister parts of the land, and cow-dung for the drier.

As fast as the dung is laid, it should be well covered, by a furrow, moderately deep, thrown over it from each side; but, where potatoes are to form the alternate drills, let the seed for these be laid on the dung, previous to covering; and, for this purpose, let the potatoes be cut in halves, lengthways, so as to give each about an equal number of eyes, and then wet them and roll them in gypsum before laying them down, which should be at the distance of about fifteen inches. The potatoe-drills being thus covered, by the furrows thrown from each side, the same process serves to cover the dung in the other furrows, and thus the beds are formed for planting the other crops in the drill-method. Indian corn may be drilled in at one operation by a drill-machine for the purpose; the same may be observed of the turnip-crop, and probably of the pumpkin; but, though attended with more labor, it may usually be expected that they will be drilled in by manual operation. We should advise that the seed in the turnip-drills be liberally strewn, in order that if part of the plants be destroyed by the flies, enough may still be left. The corn and pumpkin-seed may be droped at the distance of six inches, and thined at the first hoeing, so as to have the growing plants of the former about a foot apart, and the latter about eighteen inches. If any vacant places should happen in any of these drills, such vacancies may readily be supplied by transplanting sets, taken from parts where more plants are standing than are necessary. Any young plants may be transplanted after they have attained a suitable size, which is usually in from two to four weeks growth. The vacancies may be quickly filled by transplanting, and it is a matter well worthy of attention.

The practice, lately introduced, of laying barn-dung at a good depth, and then cove·ing it with mould to the depth of about three or four inches, and planting the seeds over the manure thus covered, seems to answer the best purpose for every drilled-crop, except potatoes; and we would therefore recommend this method of using barn-dung in preference to every other, as far as it may be wanted for drilled-crops. In this way this manure may be profitably applied while fresh; but in many instances we consider it more efficacious when applied after the process of roting or fermentation has commenced. Such is the theory of Sir *Humphrey Davy*, and we have full confidence in its correctness. When thus buried in the earth, the growing plants, placed above the manure, have the utmost means of absorbing all its gaseous and soluble parts, while the process of its decomposition is going on.

In preparing seeds, we would, as a general rule, advise to their being soaked about twelve hours in a strong solution of saltpetre, or of common salt, and then rolled in gypsum before being commited to the earth. The effect of this mode of preparing the seed seems to be, that the young plants start with more vigor, and grow larger, than they do where this treatment of the seed is neglected; and the solution of saltpetre has the further effect of bringing plants to maturity from one to two weeks sooner than they otherwise would ripen.

In selecting seed for the corn-crop, take such stalks as bear two ears, and select the best ear from each of such stalks, the grains on each end to be rejected. In all cases where it is practicable, the seeds should be taken from the largest and most perfect plants, or roots, as the case may be. By attending to this mode of selecting seed, the product of the corn-crop in particular will soon be found greatly augmented; a discovery, the honor of which is due to Mr. *Cooper*, of Newjersey. It is said that sprinkling a little gypsum on the silk of the ears of corn, will make them fill to the ends. Niping off the blossoms of the potatoe-crop, as fast as they appear, is found, by accurate experiment, to increase the growth of the roots about one-sixth part. Salt and gypsum have each a powerful effect on their growth, though by applying too much of the latter it may cause them to run too much to vines. To the corn and pumpkin-crop apply some of this latter manure, after the plants are up. What effect it has on turnips, we have never understood.

In ploughing between the drills, let it be to a good depth, first turning the furrows from the plants, runing about 4 inches from them, and then turning the furrows back, when the hoeing and hand-weeding are to follow. The second ploughing should be similar to the first, but farther from the plants; and in general, we believe, it will be found advantageous to plough and hoe the crops the third time. We have seen it highly recommended to plough among Indian corn, as late as in August. Frequent deep ploughing is certainly the best mean of keeping the ground moist, and should never be omited in case of drought. Ground that has become quite dry will be found moist after a thorough deep ploughing. At all events, the ground should be so cultivated as to prevent any weeds from going to seed in the Fall; for if this be suffered the ground will remain constantly stocked with the seeds of weeds.

We advise to the cultivation of the common turnip, the potatoe, and the pumpkin, in the manner we have mentioned, for the purpose of affording the early supply of food for feeding and fating cattle in the Fall and the forepart of Winter, before the ruta-baga crop should be used, of which we shall presently speak. We also advise to this variety of crops, in order that the cattle may have a greater variety of food; a matter of considerable importance in feeding and fating cattle. For this purpose, also, the culture of the cabbage is worthy of attention. Horses, and all sorts of cattle, faten well on pumpkins; but for Swine they should be steamboiled, and the seeds taken out, as these prove injurious to those animals, by causing too great a secretion of urine. The seeds afford an oil equal to that of the olive, and are well worth preserving for this purpose.

As soon as the ears of the corn-crop have somewhat hardened, the crop may be cut up and set in shocks, with the tops tied closely together to keep out the rain, in which way the grain will harden as well as in any other, and a great addition of fodder may thus be acquired.

During the next season, we propose to take two crops from the ground, *to wit*, a crop of ruta-baga, preceded by such Spring-crop as ripens sufficiently early to be harvested in time for preparing the ground for a full growth of this root. In the meridian of Newyork, Mr. *Cobbett* says that from the 26th of July until some of the first days in August, is the proper time to transplant this crop, the plants for the purpose being previously grown. The method of cultivating the crop by transplanting, he insists, is the preferable way; and from our own experience we are fully disposed to agree with him. Advancing to the northward, from Newyork, the seasons are shorter, and of course the crop should be transplanted earlier, while at the same time the Spring-crops are later in ripening. At Newyork, barley could be taken from the ground in time sufficient to prepare for ruta-baga: Farther to the north, this could not be the case. In the more northerly parts of this State, it would, perhaps, be difficult to find any crop, now raised in this Country, with the exception of flax, that would be sufficiently early. The fact is, we want a particular crop for this purpose; and that would seem to be the new sort of Spring-wheat lately introduced into France, which is there called *le ble de mai*, in English, the wheat of May. It is said to be a very productive species of wheat, affording a grain from which flour is made of about a medium whiteness between that of rye and wheat, and in that Country it is fit to harvest in the latter end of May. In this State, it would probably ripen no where later than the first of July, which would be in time sufficient for the crop of ruta-baga.

Until we can procure this wheat, we can only recommend that the preceding crop be such only as will ripen sufficiently early, and, where none can be had for the purpose, to be content with raising the crop of ruta-baga only in the course of the season. Where previous Spring-crops can, however, be obtained, let them be taken from the ground as quick as possible, and the ground deeply turned over, and mellowed by three deep ploughings, then furrowed at the distance of about thirty inches, the manure laid in, and covered by furrows thrown over it from each side, and the plants of ruta-baga immediately set on the ridges, by transplanting, at the distance of about a foot from each other. From our own experience, we are fully convinced that the plan of transplanting is, in the end, much the cheapest, and most advisable. We would, however, recommend not to transplant before the appearance of a heavy shower, but at any time afterwards; that the plants be of good size, say, of five or six weeks growth, and that, in seting, special care be taken to have the lower parts of the roots well enclosed with earth. For further particulars, in regard to the culture of this crop, the time and manner of using it, and of saving it, we refer the Reader to Mr. *Cobbett's* book on the subject, from a conviction that it is the best essay that has ever been published on the culture and use of this valuable plant.

It will be seen, however, that we differ from Mr. *Cobbett* in the distances in which the plants are to be set, and in the manner of forming the ridges. He forms his by four gathering-furrows, by which the ridges are each about four feet in breadth. We propose to form them by two gathering furrows, and at the distance of thirty inches. In England, the plan we recommend is generally pursued, and the ridges are usually but twenty-seven inches wide.

In the Spring of the third year, we propose to sow the ground with barley, after two or three ploughings; seed, two and a half bushels to the acre. At the same time, also, give the ground at least twelve pounds of red clover-seed to the acre, which may be carefuly mixed with the barley, and sown together. Harrow the ground before sowing, and harrow in the seed, after it has been prepared in the manner before directed; then, if the Farmer is in possession of the roller, let this be passed over the ground, particularly if it be somewhat dry; for, in such case, barley, being covered with a husk, requires a close envelopement with earth, in order that the progress of its germination be not either partially or wholly retarded. Next Spring, give the ground a top-dressing of gypsum, of from one to two bushels to the acre, as circumstances may seem to require. Two clover-crops are to be expected this season. The next, either one or two may be taken, according to the climate, but usually one only in more northerly regions; and in this case let the second growth be laid prostrate, by the roller passing over it in the same direction in which the plough is to follow, in order that the growth may be carefully turned under, which will form an excelent lay for Winter wheat, or for rye, if the climate is not adapted to the growth of the former crop.

In suitable climates, wheat will succeed on a good clover-lay, even on light sandy lands. It is believed, however, that the species of wheat which is considerably cultivated in Pennsylvania, called spelt (*triticum spelta*) may be successfully cultivated in any part of the Northern States where wheat of the common sorts does not flourish. When the sward has been thus turned under, let the surface be leveled by runing the harrow lightly over it, in the same direction the plough runs, and then cover the seed with the harrow, run in a similar direction. Let the seed-wheat be prepared in the manner before described, and let it be free from any mixture of rye, or the seeds of cockle or other weeds. Next Spring, give the ground another top-dressing of gypsum, in order that a growth of white-clover may rise after harvest, as this will afford considerable Fall-feed, and a fresh sward to be turned under in the latter part of the Fall, the effect of which will be explained when speaking of manures, &c.

Thus our rotation requires six seasons for its completion, and is composed of six or more different and successive crops. In exhibiting our plan, we intend it merely as an outline of what we deem at least one of the best and most profitable systems of culture that can be pursued in good arable lands, where all obstructions to the most complete culture have been removed. Other courses may probably be devised which may be as good; but we feel confident there can be none better. We consider this rotation as comprehending a sufficient variety of crops for every purpose of affording the land rest by changes; and although a course of rotation might be made to include a greater variety of crops, still the profits of them, in the aggregate, would probably be less than in the plan we propose. We insist much on the culture of root-crops for the greatest possible profits. In some instances, for the growths of roots and vines we propose, as well as of the grain-crops, others might be substituted, and sometimes, for the sake of further variety of growths, particularly of roots, it might be advisable; all this must, however, depend on the soil, and on other circumstances. If the soil be rich and deep, perhaps the mangel-wurtzel should have a preference to the common turnip, and the pumpkin, in the first years crop, and perhaps in such soil the cabbage-culture should sometimes come in for a share.

We should hardly advise that crops of carrots or of parsnips should ever enter the list of a general rotation of crops, as they require peculiar soils, and uncommon preparation. They are very valuable crops for particular purposes; but their uses, for feeding and fating cattle, seem to be in a great measure superseded by the less expensive culture of the crops before mentioned. There are, however, some mellow fertile soils, of sandy texture, where these roots, particularly carrots, may be cultivated with great advantage. A very serious objection to the culture of parsnips is, that, in the soils most suitable for them, they extend so deeply that their extraction from the earth is a matter of no small difficulty.

In recommending the alternate culture of the pumpkin with the corn-crop, we have been influenced by two considerations; firstly, from an account we have lately seen of a trial made of the culture of the large sort of pumpkin by itself, in which at the rate of twenty-five tons to the acre were raised; and, secondly, we are of opinion that in cultivating the crop, in the way we propose, nearly as great a product may be obtained as if the ground were planted entirely with this crop. Growing in drills by itself it will not impede the growth of the corn; nor do we conceive that this crop will be injured by the extension of the pumpkin-vines over the ground; whereas, if the two crops were planted together in the same hills, or drills, as is commonly practised, the growth of the one must, in a great measure, serve to rob the other of its due share of nutriment. The large sort of pumpkin, to which we have reference, has been raised of the weight of upwards of one hundred and fifty pounds; but it is probably less nutritious, because less sweet, than pumpkins of the common sorts. Another large sort, which we have seen exhibited in this county, of more than four feet in length, is probably entitled to a preference for culture, as it appears to be as sweet as pumpkins of the smaller kinds.

In selecting seed for the pumpkin-crop, take such plants as bear the greatest weight of pumpkins, and from the largest of these let the seed be preserved.

We have next to speak of the rotations proper for clayey lands, or those which have more or less alumin in their composition. Lands of this description are various, as well in regard to their natural fertility, as to their being more or less inclined to a superabundance of moisture. Some are naturally too wet for cultivating even grain-crops with success; and should therefore be kept for mowing and grazing-lands. Some again may be merely too wet for crops of Winter-grain, and in such case Spring-crops should be substituted; while at the same time the lands should be more applied to the business of the dairy, and of the Grazier. In the mean time, let the Possessor of lands which are naturally too wet, proceed to laying at least a part of them dry, by hollow-drains; and then by making his barn-dung principally into heaps of compost, in which lime and sand shall be considerably used as additional ingredients, and applying such compost-manure to the drilled crops before mentioned, and in the manner before directed, he will find no difficulty whatever in pursuing the course of crops we have recommended, nor of raising them of luxuriant growth. Where clayey lands are naturally dry enough for Winter-crops, we advise to a similar course of crops, with the manure prepared and used in a similar manner. In all stiff soils, however, an important point in husbandry is to keep the ground, while under a course of crops, in a mellow crumbly state; and for this purpose nothing is more conducive, than frequent deep ploughings, and raising the ground into high narrow ridges, as well to lie in that state during Winter, as for the culture of all the drilled crops in particular. The ridges are to be formed by four gathering-furrows; and in cleaving the ridges down new ones are formed, with the middle or highest part of each where the last furrows were of the former ridges. When, therefore, the manure is to be used for the drilled crop, it is to be laid in the furrows, between the ridges, and then covered over with two gathering-furrows run on each side, and thus the beds or ridges for the crop are prepared.

If, however, it should still be found that some clays, even with this management for the purpose of ameliorating them, should still be found unsuitable for Indian corn, and for the turnip and ruta-baga-crops, we can only advise that, for the former, the Winsor-bean, and, for the two latter, the mangle-wurtzel and the cabbage-crop, be made substitutes. The Winsor-bean is considerably cultivated in the clay-lands of Greatbritain; and Mr. *Deane*, in his Farmer's Dictionary, says its growth on such lands in this Country is luxuriant. Perhaps in place of this species of the bean, another, which is cultivated in the Southern States, and is there called the cowpea, should be prefered.

It should be further observed, that gypsum, when applied as a top-dressing to clay-lands, particularly those which are too wet, has but very little effect; but when they are laid dry by hollow-drains, and thrown into ridges, as before mentioned, the effect of this manure upon them is nearly the same as in other dry arable lands. And as we conceive it essentially necessary that all clay-lands which are to be cultivated for Spring-crops, as well as all other soils which are naturally too wet, should lie in ridges during the Winter, we advise that, at the begining of the rotation we have mentioned, such lands have a second ploughing in the Fall, for the purpose of being laid in such ridges. When thus laid, they are easily reduced to a mellow state in the Spring; but, if this be neglected, they will usually be found, more or less, in hard baked clods, a state very unfit for good cultivation.

In Greatbritain, it is found essentially requisite that clay-lands should be effectually Summer-fallowed, as often as every sixth year; as well for the purpose of extirpating growths of weeds, as for mellowing the soil, and rendering it more lively. A fallowing there is performed by many repeated ploughings and harrowings during the Summer. But it should be remembered, that the climate of that Country is very different from this. Their wheat-harvest is in Autumn; their Summers being wet and cool. Here we have time, after the harvest is over, to cleanse and enliven the soil by repeated ploughings and harrowings.

On hard, gravelly lands, which are unfit for any crops of roots, except perhaps potatoes, no very extensive rotation can be had to advantage, without plentiful manuring. Gypsum has a powerful effect on such lands, and with the aid of this manure alone, even the poorest of gravels may be made to yield good crops of buckwheat and of red-clover; and on a lay of this latter crop, turned under, a tolerably good crop of rye may be had. Saintfoin, and some other taprooted grasses, flourish in such soils better than might be expected. Gravelly lands require very deep and frequent ploughings, in order to make them sufficiently retentive of moisture. They are usually much assisted by compost-manures, where clay, mud, upland-marle, &c. form a considerable share of the ingredients. But as there are different degrees of fertility in gravelly lands, according to the nature of the gravel, and its greater or less predominance in the soil, we can lay down no definite course of crops that in all cases would be found most advisable. Say, however, that with effectual deep ploughings, and plenty of suitable manure for the drills, the first crop shall be Indian corn, intermixed with the potatoe and the pumpkin-growths, as before mentioned; next Spring, oats, or barley, if the ground will answer for this crop. As soon as this crop comes off, turn the stubble under, and harrow in buckwheat for a green-dressing, in the manner mentioned in treating of manures; and on this growth, turned under, sow rye, if the ground is too gravelly for wheat. Sow the cloverseed the next Spring, in the quantity before mentioned, and then harrow the ground, which will serve the purpose of covering the seed, and also of assisting the growth of the crop of wheat or rye, as the case may be. The advantage derived from harrowing these crops in the Spring has been well ascertained by experiment. After the second years growth of clover has been fed or mowed off, turn over the ground in the Fall, to commence the rotation anew.

When we speak of gravelly lands, we do not mean to include those which are, properly speaking, gravelly loams; for soils of this description are generally well fited for the rotation first mentioned. By gravelly lands we mean those where gravel is mostly predominant, as we call those lands sandy where silex forms the greatest proportion of the soil; and of these something is now to be said.

As a specimen of what may be called light sandy lands, we will refer to much of those lying between Albany and Schenectady. These, like the gravelly lands just mentioned, are not, in their natural state, calculated for the production of many different crops in perfection; nor indeed for any, without manure. With the aid of gypsum alone, however, good crops of peas, and of buckwheat, may be had on most of these lands; tolerable, of red-clover; and on the lay of clover, turned under, middling crops of rye may be had. Probably, with this manure, valuable crops of pumpkins might be raised on them. Lands of this description have, however, very essential properites, which gravelly lands do not possess; they are much easier cultivated than the harder soils, and, in proportion to their natural fertility, no lands are better adapted for root-crops of almost every sort, or for the grasses whose roots extend deep into the earth; among which are clover of different kinds, Saintfoin, lucerne, &c. Such lands are least adapted for crops of wheat and Indian corn; but, when sufficiently manured with clay, or upland-marle, which is better, they will yield tolerable crops of the latter, and also of the former, when raised on a lay of red-clover.

Where little else than the contents of the barn-yard and gypsum can be had, for manuring sandy lands of the above description, the common turnip and ruta-baga culture would not, perhaps, be advisable; but the rotation should be something like the following: First year, potatoes and pumpkins in alternate drills, manured and treated as before described; second, peas, soaked in the solution before mentioned, and rolled in gypsum before sowing, with a top-dressing of that manure; third, buckwheat, treated in the same manner, and cloverseed sown with the crop; third and fourth, clover, with a top-dressing of gypsum each Spring; fifth, rye, on the clover turned under, as before described, which completes the course.

But where upland-marle, or even clay, can be had, for the purpose of forming compost-manures with the barn-dung and the addition of some lime, as is described under manures, &c. we should advise to the rotation first described, or something similar, in which the root-crops should form a prominent part; and, in such case, let the manure be plentifully applied to the drilled crops. At first, perhaps, some of the crops would not be so abundant; but, under this management the soil would be constantly improving, and of course the crops increasing. At first, perhaps, rye should be substituted for the wheat-crop; but each addition to the soil, of the aluminous and calcareous matter of which the compost is principally composed, would render the land better adapted for grain-crops of every description.

It is a matter of the first importance to the Cultivator to possess an adequate knowledge of the different substances which may be used with advantage for fertilizing his lands, of the different soils to which such substances are best adapted, of the proper quantities to be used, and of the most advantageous time and manner of their application. There is but little even of the richest earths that will not become exhausted with constant croping without manure; and soils are seldom so sterile, but that, with a proper application of suitable manures to them, they may be made the residence of plenty.

Manures are of different kinds: Of animal, of vegetable, of fossil, and of mixed; of each of which notice will be taken in their order.

The flesh of animals is an excelent manure for all soils, and is used to a considerable extent on the seacoast, where fish are caught in plenty. It is believed that flesh is used to most advantage in composts, and the same may be observed with more certainty in regard to the use of the blood. The shavings of the horny substances of animals, have very durable effects as a manure, in dry soils, by enduing such with a greater power to retain moisture; and the same may also be observed of the hair and wool. The bones, when calcined, are also valuable, as they are principally phosphate of lime. The miasma, produced by the putrefaction of the flesh and blood of animals, is also food for plants, or at least its presence assists their growth. The urine is a fertilizer principally by reason of the salt it contains, and probably also by its producing miasma.

When animals die, it is usual to let them lie above ground, to the annoyance of the Public; but, if covered with earth, this, together with the flesh, &c. of the animal, would be converted into good manure.

Of vegetable substances, it may be generally observed, that almost every sort of vegetable, not of woody texture, buried in the soil while green, is more or less efficacious as a manure; and that many sorts of these, when turned under where they grew, and while in a green state, will add much more fertility to the soil than their growth extracted from it; but that the same growth, when suffered to ripen on the ground, and then turned under, after the exhaustion of its juices, will not generally repay the soil the nutriment it extracted from it while growing. It would seem that the ripening of plants is the principal cause of the exhaustion of soils, and, for this reason, green-dressings, that is, ploughing of green-crops under, has been found advantageous in enriching lands. Where green-dressings are resorted to, as a manure, such growths should be selected for the purpose as are cheap in the article of seed, and at the same time quick and bulky in their growths. Buckwheat has been much used for the purpose, though perhaps some other plants should be prefered. The growth should be turned under when in blossom; and, in order that this be done effectually, it should be laid prostrate, by runing the roller over it, in the same direction in which the plough is to follow; after which, the ground should not be stired again till this manure has sufficiently roted. Generally, we think it would be most advisable to sow on the lay or furrow, by which the green-crop is turned under.

There may be some instances where manuring with green-dressings may be advisable, particularly where it can be done without preventing the growth of any intervening crop. Where this is not practicable, we should hardly advise to this method of manuring, unless in cases where other manures were not to be obtained. One case we will however mention, where a green-dressing might be given to advantage. Suppose, for instance, a crop of rye, oats, or barley harvested, and the ground cleared of the crop, by the 20th of July; in that case, let the stubble be immediately turned under, and the ground harrowed in with buckwheat; by the 20th of September this growth would be fit to be turned under, when a crop of wheat might be sown on the lay. It should be understood, that rye is one of the best crops to precede a crop of wheat, or to follow it. In the same manner, therefore, the crop for a green-dressing may be raised in the wheat-stubble turned under, and the green-crop turned under for a crop of rye.

But the contents of the barnyard, and the excrements of cattle, are the principal sources of manure of the vegetable kind; and of these it is necessary to treat particularly, as well of the qualities of the different sorts, as of their most advantageous applications to soils. The sorts of dung or excrement to be noticed, are those of Horses, Neat-cattle, Sheep, and Swine. The dung of Swine is most valuable, where properly applied; that of Sheep is the next; that of Cows ranks in the third degree; and that of Horses in the fourth. The dung of the latter, if suffered to lie in a heap till it becomes thoroughly heated, assumes a whitish or mouldy color, and is then of but little value. It is of a warm nature, and is best adapted for being well buried in moist or clayey soils; cow-dung, on the contrary, is most suitable for dry soils; sheep-dung answers best on the soils for which that of Horses is best suited; but is very valuable for almost any soil. Hog-dung should only be applied to dry arable lands, and is most powerful in those of a sandy or gravelly nature. Dung, of all sorts, loses much of its valuable qualities by exposure to frequent rains, particularly when lying at but little depth over a considerable surface. Its good qualities are best preserved by lying in large heaps, and if under cover so much the better.

The stercorary is the most effectual method for preserving barn-dung, and it is believed that every Farmer will find his money well expended in the erection of this receptacle for the contents of that part of his barnyard, which is not used in the Spring. The stercorary mav serve for a sheep-fold during Winter, and will thus answer a twofold purpose. It may be, for instance, forty feet in length, sixteen in breadth, and of suitable height. The floor is to be made of a layer of clay, with the surface smoothly paved with small stones, and highest in the middle, so that the juices of the dung may run off to the sides, where a gutter receives this liquid, and carries it into a reservoir, sunk at one end, into which a pump is to be fixed to raise the liquid and throw it back over the heap. The floor, gutter, and reservoir are on a plan similar to those of a cider-press. The liquid that runs from the heap is the most valuable part, and should never be lost: This plan is therefore calculated to preserve it; and, for the purpose of absorbing the whole of it, any dry vegetable matter, or rich earth, may be laid over the heap, and this liquid thrown on that, which will serve to convert the whole into good manure. The juices of the soluble and gaseous parts of the excrements of cattle, together with the stale, are what principally afford nutriment for growing plants; and every mean by which these can be saved, by their being absorbed in other substances, of rich earthy or vegetable matter, would seem to be well worthy of attention. We will next designate what is usually considered the methods most proper for the application of dung.

Where lands are in grasses of the fibrous-rooted kinds, it is the generally-received opinion of the best Cultivators, that barn-dung, as well as manure of every other kind, should be applied as a top-dressing, that is, by spreading it on the surface: but that for tap-rooted grasses, or those whose roots extend deeply, as well as for all grain and root-crops, this manure should be buried in the soil, at such depths as are best suited to the nature of the roots of the plants to be cultivated. The operation of barn-dung, and of all vegetable and animal substances used in manure, seems to be this: If laid at a certain depth beneath the surface of the soil, in the progress of their decomposition their soluble parts pass into the form of gas, or vapor, and of course rise to the surface, and in their ascent are more or less absorbed by the roots of the plants; on the contrary, if these manures be laid on the surface, these soluble parts, in the progress of decomposition, never become aeriform, but are washed downwards, in their liquid state, where they are in like manner absorbed by the roots of the plants. This is probably as correct an explanation as can be given of the effect of these manures. It is well known that ground, long used as a graveyard, becomes very fertile, notwithstanding the substances, which are the cause of such fertility, are laid at a very great depth.

It has been held by some English Writers, that barn-dung should be well roted previous to its application as a manure; but this opinion is rejected by Sir *Humphrey Davy*, one of the most scientific Agriculturists of Greatbritain; and also by *Arthur Young*, Esq. Mr. *Davy* contends, that this manure may in most instances be as well applied fresh as in any other way, by its being laid at a proper depth beneath the surface, and that in scarcely any instance is it advisable that it should undergo more than the first stage of decomposition before it is used. When well roted it is, however, more efficacious for a single crop; but its use is of much shorter duration. It seems, also, to be generally agreed, that using this manure for drill-crops, burying it a good depth, and raising the plants over the dung thus buried, is the best possible way in which it can be used. We lately saw an account published of upwards of one hundred bushels of Indian corn to the acre being raised by this mode of culture. The success of Mr. *Cobbett*, and others, in raising great crops of ruta-baga by this method of using this manure, seems to demonstrate its utility, if evidence were wanting further than what appears in English publications on the subject.

The plan that we would therefore recommend is, to apply the fresh barn-dung to all drill-crops which are to be put in the ground in the Spring, and for these we refer to what has been said under rotation of crops. The shortest dung should be used for these purposes, except for potatoes; and it should, as far as practicable, be applied to the soils best adapted for each kind of dung, as has before been mentioned. The longer or more strawy parts of the dung, we should advise to be laid in the stercorary, if this building has been provided, or else somewhere under cover; or, if no cover can be afforded, let it be thrown in a heap about three or four feet high; and, wherever it be laid, let it be stired up from the bottom in the course of about five or six weeks after it has been thus heaped or otherwise stored away; after which it will soon be found well fited for being used for the crop of ruta-baga. It is also advisable to cover the heap with a layer of good earth, which will serve to absorb and retain much of the steam or gaseous matter that rises from the heap, and when saturated with this, and mixed with the mass of dung, will be found a valuable addition.

Of manures which may be termed fossils we will mention the various kinds of calcareous substances; the stony matter called pyrites, coal, salt; peaty substances; silicious and aluminous earths. Limestone, gypsum, chalk, and marle, are the calcareous substances we shall notice, and each in its order.

Limestone (carbonate of lime) has always more or less aluminous or silicious earth in its composition. Frequently also it contains magnisia. Limestone of this latter description, when calcined, makes what the English Farmers call *hot* lime, which is more powerful in its effects, and therefore less of it should be applied at once to the soil. That without any mixture of magnesia is considered more durable in its operation, but less powerful. Magnesian limestone is known by its effervescing but little, when plunged in nitric or other acid; while limestone that is not magnesian, when thus immersed, produces a strong effervescence. The magnesian, also, when immersed in diluted nitric acid, or aqua-fortis, renders the liquid of a milky appearance. It is usually of a brownish or pale-yellow color. Being more caustic, when calcined, than common limestone, it is more efficacious in decomposing peaty earths, and is best adapted for soils which have too much either of peaty or vegetable matter in them. Where lands have been injured by too plentiful an application of this lime, peaty earth should be applied to them, to correct the evil.

The trials of lime in this Country have been quite limited, and confined mostly to the Middle States, particularly Pennsylvania. It has usually been applied there at the rate of about forty bushels to the acre; but, whether the lime used there is magnesian, we have never understood. Lime may be applied as a top-dressing, or mixed with the soil. Its application has been found most successful, when the first succeeding crop was Indian corn: Afterwards, wheat is grown to advantage. Instances are mentioned, in the Memoirs of the

Agricultural Society of Philadelphia, where gypsum had no effect on wornout lands, till they were first manured with lime.

British Writers say that lime may be applied with equal advantage, either when newly slaked or afterwards; that its effects are not always the same, particularly where soils are different; but that usually it is a very durable manure. A much larger quantity is, however, applied in Greatbritain, than has been usual here; but perhaps the coolness of the Summers there renders more requisite. We pretend to advise to no particular rules in the application of lime in this Country, farther than that about forty bushels to the acre be first tried; but less for sandy soils, and perhaps more for those which are stiff clays, would be advisable. In clays of this description, lime is particularly useful in destroying the adhesive quality of such soils, and thereby rendering them a mere friable loam. Such has been its effects on the clay-lands which abound so much in England. Where the lime is magnesian, let trials be made of about twenty bushels to the acre.

That Country abounds much in the calcareous matter denominated *Chalk*, which is also converted into lime by calcination, and used as a manure. It forms a weaker sort of lime. As this substance, however, is hardly to be found in this Country, it will be unnecessary further to speak of this manure.

Gypsum (sulphate of lime) is a most powerful stimulant to the growth of many crops, in all dry soils in this Country; but with the following exceptions: It has no sensible effect on lands newly cleared, on those in the vicinity of the ocean, nor on those which have been completely exhausted by severe croping. In soils of this latter description, some pabulous matter must be given them for the gypsum to digest or act upon; and this may be a previous manuring with lime, marle, bog-earth, barn-dung, or perhaps any substance that is calculated to improve the condition of the soil. It should also be observed, that the application of gypsum frequently fails entirely of producing its effects, if followed by uncommon drought, or unusually wet weather. It is generally most powerful, when applied to growths of leguminous plants, to those extending in vines, such as the various species of the gourd-tribe, the strawberry, &c. and to several sorts of the green-crops, particularly potatoes, clover-grasses, lucern, &c. On fibrous rooted grasses, and those grain-plants most nearly related to them, such as wheat, rye, oats, barley, &c. it has no sensible effect, when applied as a top-dressing to the growing plants. On Buckwheat it is very powerful, and for Indian corn it is also valuable.

Judge *Peters*, of Pennsylvania, whose experience of its uses has been long and extensive, says, that although he has found this manure of little use to many sorts of plants, when applied to them as a top-dressing; yet he has invariably found that all plants derive benefit from their seeds being rolled in gypsum, after being soaked in some liquid before sowing or planting. As a manure, however, for wheat, or grain-crops of similar kinds, immense benefit may be derived from it, by applying it to the sward, as a top-dressing, as uitable length of time before the ground is broken up. In this way, two bushels of gypsum may be made to give an additional increase of eight or ten bushels of wheat to the acre. Take, for instance, land which in its natural state, and with the usual culture, will only yield ten bushels of wheat to the aere; in the Fall, or early in the Spring, give it a top-dressing of two bushels of gypsum to the acre; by the middle of June following the land will exhibit a fresh green-sward, principally of white-clover; and when land is thus clothed in verdure, it is a sure indication of a great addition to its fertility, and that a good crop may then be expected. When, therefore, the green-sward is thus formed, turn it under, and then, with the usual culture, twenty bushels of wheat to the acre may be expected, where only ten would have been had without this application of gypsum. Yet the same quantity of this manure, applied as a top-dressing to the growing crop of wheat, would have had no sensible effect. It should therefore be understood, that for all growths which derive little or no benefit from gypsum, when applied as a top-dressing to the growing plants, the ground should be previously enriched by applying this manure to the sward, a suitable length of time before it is to be broken up, which will usually be from two to three months. At all events, as soon as the sward fully exhibits the effects of the gypsum it may be turned under. Wherever a sward is to be turned under, this practice should be invariably pursued, that the ground may be rendered more fruitful for the crop that is to follow.

In this Country, gypsum is a great source of wealth, wherever soils are sensible to its effects. It has tended much to equalize the value of lands, by imparting an artificial fertility to those naturally more sterile, and that at a small expense. But gypsum alone is by no means sufficient for keeping lands in the improved condition that is necessary for raising the best crops, and of course deriving the greatest profits. The Farmer should attend also to making the most of such other manures as come conveniently within his reach. We are, however, no Advocate for obtaining manures at any price: They may cost too much; but almost every Farmer, whose lands are of suitable quality, and who stocks them with as many cattle as he can keep in good order, and then makes the best use of the manure they afford, may usually, with the judicious use of gypsum, added to good culture, keep his lands in an improving condition.

But some soils are so constituted as to be of diminished value, without a suitable mixture of other earths, and in such case are permanently benefited by such additions. If lands, for instance, are too sandy, or gravelly, the addition of clay to them, or, what is better, of upland-marle, will permanently improve the soil; and where these earths can be found within reasonable distance it will usually be labor well expended. We will state a case in point. In the rear of the city of Albany lies an immense body of calcareous earth, which may properly be called a schistic-marle. It is commonly called blue-clay. This, when mixed with a due proportion of sand, forms a very fertile and durable soil. Farther west of the city lie large tracts of sandy lands, which require suitable proportions of this marle to render them fit for good culture, and with such additions much of them would be found very valuable. Where they lie sufficiently level, and are not too sandy, it will probably be found that from half a ton to a ton, for every rod square, would be sufficient to render them very fertile, and fited for the most profitable rotations of crops.

This sort of marle, which may be found in various parts of the Country, and very frequently under tracts of sandy lands, is a valuable and permanent manure in all dry soils which are deficient of calcareous matter, and have not already too great a proportion of clay. This manure should be laid on the land as a top-dressing, that it may be completely pulverized before it is mixed with the soil.

Upland-marle is sometimes found of silicious texture, in which case it is good for stiff soils, as well as for others. It is also found of different colors, when combined with argilaceous matter, and of different qualities; that containing most lime or calcareous matter being always the best. Marles of this description are often very valuable in forming a principle ingredient in composts, of which we shall presently speak, and the same may be observed of the superior sorts of this manure found in bog-swamps, of which something shall now be said.

This sort of marle is found, at greater or less depths, beneath the surface of many bog-swamps, and is of a whitish, a grayish, or a brownish color. The whitest is the most powerful, having most lime in it; the grayish is next in quality. The superstratum is either a bog-earth, *to wit*, vegetable matter totally decomposed; or it is a peaty substance, or vegetable matter in a partial state of decomposition. The bog-earth is good manure of itself, and may be used separately, or mixed with the marle; the peaty substance must undergo a further decomposition, before it is rendered valuable as a manure, it being then rendered similar to bog-earth. These manures, when applied to growing crops, are somewhat similar in their effects to those of gypsum. They are valuable as top-dressings, or for mixing with the soil. Their effects are very powerful on Indian corn, and they are more or less valuable when applied to almost every sort of upland-crop, with the exception of wheat, rye, and barley. For these they are to be applied to the sward, a suitable time before breaking it up, as has been mentioned in regard to gypsum. It should, however, be observed, that neither decomposed peat, nor bog-earth, should be applied to soils which already contain too great a proportion of decomposed vegetable matter.

The condition of clay-soils is also permanently improved, by mixing a due proportion of sand in them. The most durable and perfect soil is chiefly composed of certain proportions of sand, clay, lime, and vegetable matter in a state of decomposition; and, whenever any soil is destitute of a due proportion of any of these, the addition of such earthy substance can never fail to serve as a manure.

The stony earth called pyrites, when pulverized by the aid of a proper degree of calcination, is much used, and highly esteemed, in Flanders, as a top-dressing for grass-lands, as is mentioned in a communication of the late Chancellor *Livingston* to the Society for the promotion of the useful arts in this State. We will refer the Reader to the second volume published by that Society, for the manner of preparing this manure, and the quantity to be used, &c.

Of *Coal*, we shall merely state that, from the results of experiments made by the late Mr. *Muhlenberg*, of Pennsylvania, about forty bushels to the acre of this substance, pulverized in the manner of gypsum, was found a good manure, when applied as a top-dressing.

Common *Salt*, pulverized, and applied as a top-dressing, at the rate of from two to four bushels to the acre, has, in many instances, powerful effects as a manure. Sea-water is peculiarly adapted for this purpose. Mr. *Deane*, in his Farmer's Dictionary, mentions an instance where a crop of potatoes, and another of flax, were greatly increased in product by an application of sea-water to them while growing. About a pint of the water was applied to each hill of potatoes, and for the flax-crop the water was sprinkled over the ground.

Some trials have been made in this Country of *burnt-clay*, as a manure, and its use is recommended, particularly for all dry arable lands, not inclining to clay. The first step in preparation for burning clay is, to have a considerable quantity of this earth dug up in spits, and laid to dry in the sun: When pretty well dried, you prepare for burning by raising a little pile of dry wood in the shape of a pyramid, say, four or five feet high; round this you build up the dried spits of clay, leaving a hole at the bottom, for the entrance of the air, and another at the top, for it to pass off. Such, at least, was the method formerly practised in Greatbritain; but the modern improvement of retaining the smoke within the mass, agreeably to the plan spoken of by Mr. *Cobbett*, for burning earth, ought also to be pursued in burning clay. After the fire has been set to the wood, you continue diging up fresh clay and piling it around and over the heap, as fast as the fire penetrates the mass; taking care, however, not to pile on so much at once as to extinguish the fire. If there be danger of its becoming extinguished, it may be advisable to make one or more holes in the sides of the heap by runing a pole into it. The fresh earth is to be added during pleasure, or until a sufficient quantity is burned. After the heap has cooled it is fit for use, by mixing with the soil, as directed by Mr. *Cobbett*, for applying burnt-earth, of which we will next speak.

By a late improvement, earths, other than those of clay, are successfully converted into good manure, by the process of burning. It is effected by retaining the smoke within the mass of earth, while in a state of ignition. Mr. *Cobbett* says he has tried this manure for the ruta-baga-crop, and found it as efficacious as barn-dung. His manner of preparing it, and which we believe would also be the best method of preparing burnt-clay, is as follows:

'I make a circle (says Mr. *Cobbett*) or an oblong square. I cut sods and build a wall all round, three feet thick, and four feet high. I then light a fire in the middle with straw, dry sticks, boughs, or such-like matter. I go on making this fire larger and larger, till it extend over the whole bottom of the pit or kiln. I put on roots of trees or any rubbish-wood, till there be a good thickness of strong coals. I then put on the *driest* of the clods that I have ploughed up round about, so as to cover all the fire over. The earth thus put in will burn. You will see the smoke coming out at little places here and there. Put more clods wherever the smoke appears. Keep on thus, for a day or two. By this time, a great mass of fire will be in the inside. And now you may dig out the clay, or earth, any where round the kiln, and fling it on without ceremony, always taking care to *keep in the smoke;* for, if you suffer that to continue coming out at any one place, a hole will soon be made; the main force of the fire will draw to that hole; a blaze, like that of a volcano, will come out, and the fire will be extinguished.

'A very good way is, to put your finger into the top of the heap here and there; and, if you find the fire *very near*, throw on more earth. Not *too much at a time*, for that weighs too heavily on the fire, and keeps it back; and, at *first*, will put it partially out. You keep on thus augmenting the kiln, till you get to the top of the walls, and then you may, if you like, raise the walls, and still go on. No rain will affect the fire, when it is become strong.

'The principle is to *keep out air*, whether at the top or the sides, and this you are sure to do, if you *keep in the smoke*. I burnt, the last Summer, about thirty wagon-loads in one round kiln, and never saw the smoke at all, after the first four days. It put in my finger to try whether the fire was near the top; and, when I found it approaching, put on more earth. Never was a kiln more completely burnt.

'Now, this may be done on the skirt of any wood where the matters are all at hand. This mode is far preferable to the *above ground-burning in heaps*. Because, in the next place, the *smoke escapes there*, which is the finest part of the burnt matter. *Soot*, we know well, is more powerful than ashes, and soot is composed of the *grossest parts of the smoke*. That which flies out of the chimney is the best part of all.

'In case of a want of wood wherewith to begin the fire, the fire may be lighted precisely as in the case of *paring and burning*. If the kiln be large, the oblong square is the best figure. About *ten feet wide*, because then a Man can fling the earth easily over every part. The mode they pursue in England, when there is no *wood*, is to make a sort of building in the kiln with turfs, and leave airholes at the corners of the walls, till the fire be well begun. But this is tedious work; and is in this Country wholly unnecessary. Care must, however, be taken, that the fire be well lighted. The matter put in *at first* should be such as is of the lightest description; so that a body of earth on fire may be obtained, before it be too heavily loaded.

'The burning being completed, having got the quantity you want, let the kiln remain. The fire will continue to work, until all is ashes. If you want to *use* the ashes sooner, open the kiln. They will be cold enough to remove in a week.'

A practice has long prevailed in Europe, of paring and burning soils, for the purpose of improving their texture and increasing their fertility. On clay-lands, and such as contain too much vegetable matter, we conceive the process might be advisable, if not too expensive. Its effect on clays is to destroy the adhesive quality of the soil, as the earth burned becomes rather of a silicious texture; and at the same time the surface is much enriched by the operation. In the other case, it is calculated to reduce the redundancy of vegetable matter, as well as to enrich the soil. The operation is performed in the following manner:

When the ground is in a good sward of grass let it be carefully turned over with the plough; the irons of which should be well sharpened. Let the plough run about three inches deep. Then cross-plough with a very sharp coulter, and the sward will all be cut into squares of about ten or twelve inches. Set these square chunks up edgways, by leaning two together, and they will soon dry. When well dried, build a part of them up in the form of little ovens, at the distance of about eighteen feet each way. These are all to have a little opening or door, at a common windward side, for the air to enter, and another opening above, for the smoke to pass off. On some dry day, when the wind is fair for blowing into the holes below, place some straw or other dry rubbish into the holes, and set fire to it. As soon as the fires have got fully going in each of the heaps, let the holes in the tops be stoped up, for the purpose of retaining the smoke, and keep gradually building up the heaps as the fire penetrates them, until all the chunks of earth are piled up round them; and when the heaps have fully burned, and sufficiently cooled, they are to be evenly spread over the ground, and ploughed in.

In some parts of Greatbritain it has been the practice to burn peat-earth, in a manner very similar to that before described for burning clay, and the ashes were used for top-dressings; but we believe this practice has mostly given way to that of roting or decomposing peat in compost; as follows: You form the compost-heap of about one-half of peat, a fourth of lime, and a fourth of barn-dung, and these are to be separately laid along in a manner most convenient to be afterwards thrown into the compost-heap in their proper proportions. You commence at one end with spreading a layer of peat on the ground, say, ten feet square and four inches in depth; then a layer of lime on this, and another of barn-dung, each two inches thick; then another layer of peat, as before, and then the lime and barn-dung, as before, until in this way the heap is raised about four feet high, and let the last layer be of peat: Then commence another ten-feet square alongside of this, and raise it, as before, till you raise it to the same height; then with another ten-feet square, at the end of this mass, and so on, till the heap is completed. After the heap has stood a while, it will heat, and when the heat begins to subside, you commence again at one end of the heap and cut the whole down to the bottom, with the spade, and form a new heap, throwing the exterior parts of the heap, thus cut down, into the middle of the other. A second heating of the mass will then commence, and when that subsides, the peat will be found sufficiently decomposed, and the whole an excelent mass of manure.

In this Country, peaty substances are usually to be found in morasses; as the superstratum of marle, as before mentioned; as the principal ingredient of the salt-marshes contiguous to the ocean; and as the superstratum of tracts of cold lands which are covered with growths of evergreen trees.

In making composts with upland-marle, before mentioned, the proportions of the marle, with that of the lime and dung, may be similar to those just mentioned for the peat-composts, or perhaps the marle may be in greater proportion. The layers of each may be as before described, but the heap only raised to such height that it may be cleft down to the bottom with the plough, then thrown together in a ridge again with this implement; and let these operations be repeated, at intervals, till the whole becomes well mixed, pulverised, and in a state of fermentation; when it is fit for use, and should be immediately applied to the soil, in the manner before mentioned.

The use of wood-ashes, as a manure, is well known. It is good for almost all crops, and is to be used as a top-dressing. It is much more efficacious as a manure in some parts of the Country than others, particularly on Longisland. It is most valuable on light dry soils, particularly those which are sandy. Soot, as a top-dressing, is much more valuable than ashes, and is proper for almost all arable lands. It is most efficacious when well pulverized before its application.

The dung of fowls of every sort has much calcareous matter in it, and is very efficacious applied as top-dressings. Malt-dust is good in the same way: Forty bushels of it is a proper allowance to the acre.

Nightshade should be mixed with earth, say, two-thirds of the latter to one of the former, and in the course of a few months it forms an excelent manure. In most European cities this excrement is carefully collected, for manure; while in this Country its use has been neglected.

Many liquids are furnished from every domicile, and particularly the kitchen, which, mixed with earths, and other substances, would form valuable masses of manure. The liquids to which we principally refer, are the soapsuds, dishwater, brine of meat, urine, &c. These should all be preserved, by being absorbed in rich earthy substances, together with the contents of the hogsty; and in this way a large heap of good manure may be made, that is commonly lost for want of attention in saving these ingredients.

ERRATA.

In page 5, for *rulled the storm*, read *rul'd the storm*. Page 15, for *and crop-ploughed*, read *and cross-ploughed*. Page 28, for *a kind of diuhoea*, read *a kind of diarhoea*. Page 38, for *deaded the fires*, read *deaden the fires*. Page 40, for *Scoth*, read *Scotch*. Page 62, for *Fioria*, read *Fiorin and Guinea-grass*. Page 66, for *lacuations*, read *lacerations*. Page 80, for *froms hells*, read *from shells*. Page 93, for *stiff particularly*, read *stiff clays particularly*. In page 103, in the last sentence of the third paragraph from top, the two middle lines are to be transposed, in order to render the sentence intelligible. Page 115, for *taking of*, read *taking off*. Page 128, for *Anthox Anthum*, read *Anthoxanthum*. Same page, for *severe clod*, read *severe cold*. Page 157, 10th line from bottom, for *see Swine*, read *see Steamboiler*. Page 168, for *acid of lime*, read *aid of lime*.

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